

THE MARINE REVIEW

VOL. XXXV.

CLEVELAND, MARCH 14, 1907.

No. 11

NEW NAVAL PROBLEM.

Washington, D. C., March 13.—A careful scanning of the naval appropriation bill as it finally passed the senate and was signed by the president reveals that it carried more for new construction than was anticipated when the measure made its first appearance in the house. All of the amendments with one exception which were proposed by the senate were adopted in the conference committee.

The bill provided for the construction of one new battleship and two torpedo boat destroyers. An appropriation was also provided for the construction of the battleship authorized last year and an increase in the allowance for three torpedo boat destroyers authorized in last session's bill. Each of these torpedo destroyers are now to cost \$800,000.

The two battleships, the construction of which will begin as soon as the contracts can be let, will cost about \$6,000,000 for the hull and machinery. That is exclusive of the armor and armament. These vessels are to be the equal of any afloat, or 20,000 tons displacement and 20 knots speed. It is claimed that the batteries of the new battleships will be more powerful and the guns so mounted to permit better concentration of fire than any ships now under construction. They mark a distinct advance in naval construction.

Naturally the interest of naval men centers about these ships, and no effort will be spared to make them as efficient as possible. As to the arrangement nothing could be better, but there is some criticism at the conservatism of the engineers' bureau in their hesitancy to adopt turbine engines, that are now fast gaining favor in foreign fleets. This type of engine was installed in the famous Dreadnought and will be installed in other English battleships now building. The novel feature of the new battleships lies in the arrangement of their batteries. The 10 12-in. guns will be mounted in five turrets, so arranged

as to concentrate the whole 10 on either side. The secondary batteries consist of 16 5-in. guns.

The total for "increases of the navy" was \$22,713,915; of this amount \$3,000,000 was added in the senate to the allowance for armor and armament. In addition to these amounts for increases of the navy the bill authorized the modernizing of the batteries on the Iowa, Monterey and Brooklyn, and appropriates \$4,000,000 for reserve ammunition. When this item came from the house it was \$2,000,000. The senate doubled this appropriation. The material which is to be purchased with this appropriation is good until used, and it has been demonstrated that modern wars are of such duration that there is no time to make up deficiencies after war has been declared.

The question of the navy yard vs. private builders seems to have been pretty well settled, as all the ships authorized by this bill are to be contracted for with private builders, except in the advent of collusion among bidders. An effort was made to have at least part of the new construction given to the government navy yards, but congress seemed to have learned a lesson from the building of the Connecticut and the Louisiana.

NEW SAULT LOCK.

Washington, March 13.—As the river and harbor bill was finally agreed to in the conference committee it is provided that only the land needed for the new Sault lock shall be acquired by the government; and that no new water rights shall be created to embarrass the government in the farther improvement of the St. Marys river.

The senate provision authorizes the government to acquire all of the land and waters between the existing canal and international boundary. So many difficulties were encountered by the conference committee in reaching an agreement that the interested parties were given a hearing by the committee. This was an un-

heard of proceeding in congress and it probably has never taken place before in the senate. Here is the provision as it finally passed the house:

And it is further provided, that the work of improvement shall proceed without delay by reason of conflicting or other claims of title or interests and without prejudice to any pending litigation in reference thereto.

And all lands and waters north of the present Saint Marys Falls ship canal throughout its length, and lying between said ship canal and the international boundary line, needed in connection with the execution of this project, or any project heretofore adopted by Congress, for improving St. Marys river at the falls, aside from any lands owned by the United States, all of which are hereby made available for said project, shall be acquired in the following manner and under the following conditions:

The secretary of war may, in his discretion, enter into negotiations with any persons or corporations claiming title to any portion of the land or waters required for the construction of the said canal, and may acquire title to such portions of such river or lands as may be required for its construction and operation, but any agreement made by him shall be without prejudice to any claim of title by the United States and without the grant of any rights or privileges in said river or lands therein which shall create a right to compensation in case any further portion of said river or said lands therein between the canal herein provided for and the international boundary line shall be hereafter required for purposes of navigation.

If such lands and waters can not be obtained in the manner and under the conditions above set forth the same shall be acquired as follows:

The secretary of war may cause proceedings in condemnation to be prosecuted under existing law, or a copy of the said plans numbered three on a large scale, shall be prepared and exhibited in the office of the United States engineer at Sault Ste. Marie, and the attorney-general shall proceed to ascertain the owners or claimants of the premises embraced therein, and shall cause to be published for the space of thirty days, in one or more daily newspapers in the city of Sault Ste. Marie, that the same has been taken for the uses mentioned in this act, and notifying all claimants to any portion of said premises to file, within its period of publication, in the department of justice, a description of the tract or parcel claimed and a statement of its value as estimated by the claimant. On application of the attorney-general, the presiding judge of the circuit court of appeals of the United States for the sixth circuit shall appoint three persons, not in the employ of the government or related to or in any manner connected with the claimants, to act as appraisers, whose duty it shall be, upon receiving from the attorney-general a description of any tract or parcel, the ownership of which is claimed separately, to fairly and justly value the same, and report such valuation to the attorney-general, who thereupon shall, upon being satisfied as to the title of the same, cause to be offered to the owner or owners the amount fixed by the appraisers as the value thereof; and if the offer be accepted, then, upon the execution of a deed to the United States in form satisfactory to the attorney-general, the secretary of war shall pay the amount to such owner or owners from the appropriation made therefor in this act.

In making the valuation the appraisers shall only consider the present value of the land or

property acquired without reference to its value for the uses for which it is taken under the provisions of this act.

The appraisers shall each receive for their services five dollars for each day's actual service in making the said appraisements.

Any person or corporation having any estate or interest in the premises, who shall for any reason not have been tendered payment therefor as above provided, or who shall decline to accept the amount tendered therefor, may, at any time within one year from the publication of notice by the attorney-general, as above provided, file a petition in the court of claims of the United States, setting forth his right or title, and the amount claimed by him as damages for the property taken; and the court shall hear and adjudicate such claims in the same manner as other claims against the United States are now by law directed to be heard and adjudicated therein: Provided, That the court shall make such special rules in respect to such cases as shall secure their hearing and adjudication with the least possible delay.

Judgments in favor of such claimants shall be paid as other judgments of said court are now directed to be paid; and any claimant to whom a tender shall have been made, as hereinbefore authorized, and who shall decline to accept the same, shall, unless he recover an amount greater than so tendered, be taxed with the entire cost of the proceeding. All claims on account of ownership of any interest in said premises shall, unless petition for the recovery thereof be filed within one year from the date of the first publication of notice by the attorney-general as above directed, be forever barred: Provided, That owners or claimants laboring under any of the disabilities defined in the statute of limitations of the State of Michigan may file a petition at any time within one year from the removal of the disability. Upon the publication of the notice as above directed, the secretary of war may take possession of the premises embraced in said plan numbered three, and proceed with the construction herein authorized; and upon payment being made therefor, or without payment, upon the expiration of the time as above limited, without filing the petition, absolute title to the premises shall vest in the United States, and no permits shall be granted by the secretary of war or other official of the United States granting the right to occupy any portion of the land or waters of St. Marys river in the locality for said ship canal herein provided for, or between the same and the international boundary line except upon the express condition, accepted by the grantee therein, to the effect that the erection of structures or the utilization of water power shall create no rights against the United States in case the whole or any part of the said river or the lands therein is required for the purposes of navigation, and further, that such structures or rights so granted shall be surrendered to the United States without cost when so required for purposes of navigation aforesaid, and any and all rights under any permits or licenses heretofore granted shall be deemed to be revoked unless such permits or licenses are reissued upon the terms that further improvements and expenditures shall entitle the licensee to no greater consideration than such licensees are now entitled to, if any; but nothing herein contained shall be held to imply that any right now exists to compensation on account of expenditures made or alleged claims under licenses heretofore granted.

The secretary of war may acquire lands for the location of remedial or compensating works to the extent required to enable the Michigan-Lake Superior Power Co. to comply with the provisions of the river and harbor act of 1902, but such lands, if so acquired, shall be obtained without expense to the United States.

MANCHESTER SHIP CANAL.

The report of the Manchester Ship Canal Co. for the half year ending Dec. 31, 1906, has been issued. The result of the half year's working of the ship canal department was an increase of £24,959 in the receipts, of £4,007 in the expenditure and £20,962 in the profit, as compared with the corresponding half of the previous year. It should be noted that the increase of £4,007 in the expenditure is in comparison with a half year during which the sum of £2,377 was expended on the official opening of the new dock.

The following is a comparison of the

traffic for the 13 years during which the ship canal has been open:

Seaborne traffic.		Seaborne traffic.	
Year—	Tons.	Year—	Tons.
1894.....	686,158	1901.....	2,684,833
1895.....	1,037,443	1902.....	3,137,343
1896.....	1,509,658	1903.....	3,554,636
1897.....	1,700,479	1904.....	3,618,004
1898.....	2,218,005	1905.....	3,993,110
1899.....	2,429,168	1906.....	4,441,241
1900.....	2,734,843		

The receipts for the year showed an increase of £49,401, and the expenditure of £17,439, including a provision of £8,000 for the Irlam accident. The net result was an increase of £31,962 in the working profit.

GERMAN COMBINE.

Under the title of Central Verein Deutscher Rheder (Central Union of German Shipowners), the German shipping interests effected an organization at Berlin recently.

The effect of the general well being of the empire has been such as to encourage the ship owners to combine, and while each member of the combine is free to develop his own resources to the utmost extent, the great aim of the new association will be to deter any of the parties from injuring any of the others, through excessive or ruinous competition.

The most significant fact, perhaps, in regard to this latest combine is the absolute harmony, which has been induced between interests hitherto conflicting almost to the point of war. Difficulties there, of course, always will be, but the fundamental principle has found acceptance that in many respects the competitors are on common ground, and they have resolved that nothing shall be done on that common ground that may in any way prejudice even the smallest members of the association.

BRITISH SHIP OWNERS' PARLIAMENT.

The Chamber of Shipping of the United Kingdom meets once a year in London to discuss those questions which are of interest to the trade, more especially the matters to which parliament is giving attention, or to which it is likely to do so. At the recent gathering there was a speech by Sir John Ellerman laying stress upon the gloomy prospects for British shipping owing to the recent legislation in parliament. The compensation act came in for much criticism, Sir John predicting the extinguishment of British sailing vessels by its means.

The Thames dock question was also discussed, and altogether the prospects seemed to be none too alluring.

As an antidote to the undue optimism of Mr. Lloyd George, the figures quoted by Sir John Ellerman with regard to the profits of the steamship companies of the country will do excellent service. An average dividend in three years of four and one-third per cent by concerns

owning two-thirds of the capital of these companies, whilst as regards the remaining third an actual absence of dividend altogether for one or more of the three years is anything but promising to the investor, and the government which in the face of such a result insists upon increasing the cost of working by fresh legislation is certainly going the way of frightening capitalists from the business.

OPERATIONS OF CHARLES W. MORSE.

Charles W. Morse is credited with having acquired almost complete control of Atlantic and Gulf shipping, only about seven lines remaining outside his combine. The position of Mr. Morse is strategical in view of the recent railroad rate enactments and he is now in a way to compete actively with the haulers of slow freight on land.

Included in the combine are eight steamship companies, viz.: Hudson Navigation Co., three vessels operating on the Hudson river; the Clyde line with a fleet of 21 ships; the Ward line, 20 ships and Mallory line, 11 ships, all in the southern coastwise trade; the Metropolitan Steamship Co., four ships trading from New York to Boston; the Maine Steamship Co. and the Eastern Steamship Co. with 22 ships, and Mr. Morse's latest purchase, the New York and Porto Rico Steamship Co., with nine vessels.

Negotiations are said to be under way for the purchase of the Red "D" line, operating mail and passenger steamers to Porto Rico and Venezuela, and also for the acquisition of the Tietjen & Lang Dry Dock Co., of Hoboken, N. J. These ventures, however, have not been concluded.

It is also quite generally believed that although Mr. Morse failed in his first attempt to acquire the Sound lines of the New York, New Haven & Hartford railway, he will not so easily accept defeat and will probably make further negotiations before inaugurating a rate war.

There has been some conjecture as to who might be Mr. Morse's associates in his \$60,000,000 Consolidated Steamship Co. of Maine and the various lines now under his control, the capitalization of which aggregate more than \$80,000,000. It has been reported that Chas. M. Schwab, former president of the steel trust, and John W. Gates and his associates are among Mr. Morse's active supporters, and the "copper king," F. Augustus Heinze, as well as Charles F. Murphy and other Tammany hall leaders are mentioned in this connection.

It is reported that the Southern Pacific is to rearrange its Morgan line service so as to compete directly with the Morse West India lines, the probable

change being the including of Havana as a stopping place on the New York to New Orleans service, reversing the route on the return trip. The North German Lloyd Steamship line is also said to contemplate establishing a New York-Havana service and altogether there are prospects of interesting developments in coastwise shipping circles in which Mr. Morse's combine will play a very important part.

The names of the various vessels acquired by Mr. Morse, together with their net tonnage, is as follows:

CLYDE LINE.

Algonquin	2,258
Apache	2,137
Arapahoe	2,135
Benefactor	633
Carib	1,280
Cherokee	1,967
Chippewa	2,155
Comanche	2,073
George W. Clyde	1,514
Goldsboro	486
Huron	2,254
Iroquois	2,236
Katahdin	2,155
Mohican	1,770
Navahoe	1,199
New York	1,805
Oneida	1,091
Onondaga	2,155
Seminole	1,057
Winyah	1,445
Yeneassee	1,379

MALLORY LINE.

Alamo	2,237
Comal	2,251
Concho	2,640
Lampasas	2,237
Nueces	2,465
Sabine	2,331
San Marcos	2,188

METROPOLITAN STEAMSHIP CO.

H. F. Dimock	1,786
H. M. Whitney	1,790
Herman Winter	1,769
James S. Whitney	1,926

EASTERN STEAMSHIP CO.

City of Rockland	1,696
City of Bangor	1,113
J. T. Morse	428
Penobscot	1,244
Bay State	1,537
Gov. Dingley	2,856
Calvin Austin	2,853
Ransom B. Fuller	1,023
Governor Cobb	1,556
City of Augusta	252
Monhegan	198
Mineola	107
Island Belle	106
Catherine	111
Juliette	78

Camden (building).

Belfast (building).

Unnamed (building).

HUDSON NAVIGATION CO. (PEOPLES' LINE.)

C. W. Morse	3,500
Adirondack	2,848
Dean Richmond	2,322

MAINE STEAMSHIP CO.

Horatio Hall	2,007
Manhattan	982
North Star	1,999

WARD LINE.

Antilla	2,174
Tabaristan	2,173
Bayamo	1,992
Cienfuegos	1,139
City of Washington	1,744

Edwin Bailey	119
Esperanza	2,948
Hercules	111
Manzanillo	1,177
Matanzas	2,103
Merida	3,824
Mexico	3,824
Monterey	2,948
Morro Castle	3,732
Niagara	1,668
Santiago	1,696
Seguranca	2,806
Seneca	1,912
Vigilancia	2,934
Yumuria	1,166
NEW YORK & PORTO RICO STEAMSHIP CO.	
Carolina	3,006

MARINE COURSES AT GEORGE WASHINGTON UNIVERSITY.

The George Washington University at Washington, D. C., is offering courses which will fit the American youth for the nautical profession either as officers on the bridge or chief engineers below. The Admiral Powell scholarships for the free education of ambitious young men who desire to enter the nautical service provide funds for this purpose. The engineering course is expanded to keep abreast of the times and includes instruction on gas engines, high potential engineering, compressed air machinery, marine machinery and ordnance engineering, the latter a course probably not heretofore given outside of the national academy at Annapolis.

A TREMENDOUS SEA.

Battered by the sea, the British steamer, Earl of Douglas, which sailed from Grangemouth on Dec. 28, with a load of pig iron, arrived in New York recently. She had a heavy northern gale out of port, and there was no moderation of wind or wave when she got well out on the Atlantic. The vessel was badly damaged by an enormous sea on Jan. 2.

The Earl of Douglas was blowing her way at a six-knot gait on the early morning of Jan. 2. She was then in latitude 53:50, longitude 22:10. Chief Officer Johnson, with a lookout and a wheelman, were on the bridge, some forty feet above the main deck, when suddenly two cross seas arose just in front of the vessel's starboard bow and came together like a report of a cannon. The mighty mass of water arose in a pyramid. Into this the vessel poked her bow, and in an instant the water shut out from view the head of the foremast, fifty feet above the deck, and came straight on thundering against the deckhouse and the men on the bridge.

Johnson saw it coming, but being on the port side of the bridge, he got only a wetting. He tried to shout a warning to the other men, but could not make himself heard. The wheelman, William Ross, was standing at the wheel in a

structure of wood waist high, and covered with canvas. When the water passed he could not be found, and the wheel and wheelhouse were a mass of wreckage. The lookout had managed to duck under a rail, and picked himself up with no injuries but bruises.

The chief officer rang the engines down and ran to Capt. Jameson in the chart house. "Wheelman missing, sir," shouted Johnson. They both ran to the bridge and began a search for the missing seaman. The captain was attracted by a tiny stream of blood on the deck beside the wreckage, and both men tore off the wood and canvas, to find the man beneath it. His head was badly cut in two places, and he was a week in the ship's hospital.

The great sea caused havoc to everything forward. The bridge was smashed and twisted, the steel bulkhead set back three inches, the deadlights and brass frames in the captain's cabin were smashed and the place flooded, the skylight broken in, and two of the iron stanchions and two iron braces which supported the port bulwarks snapped. The bottom of the port boat on the bridge deck was knocked out.

The awning frame on the forecabin was carried into the well, and even the casing ripped off the steam pipes. The binnacle and compass were also smashed. The captain estimated the great wave to have been sixty or seventy feet in height.

The vessel drifted helpless in the terrific sea, until the men could get to the steering gear in the charthouse. She then had to be hove to for some hours to ride out the fury of the storm.

"The bridge is forty feet above the main deck," said Capt. Jameson, "and I never thought the water could get up that high."

CANALS AS REMEDY.

A paper, prepared by Charles E. Perkins, chief engineer of the Ohio state board of public works, was read at the annual meeting of the Ohio Engineering Society at Columbus last week, in which he advanced the belief that a solution of the transportation problem in the northwest lies in the improving of the canal system and navigable rivers in that section of the country, for the transporting of heavy freight. Among the resolutions adopted was one favoring active work in the abatement of the smoke nuisance. The following officers were elected for the ensuing year: President, A. F. Cole, Marietta; vice president, William Wilson, Niles; secretary, E. G. Bradley, Columbus; trustees F. E. Myers, Canton; J. H. Ashed, London; John Laylin, Norwalk; R. E. Kline, Dayton and B. E. Trask, Granville.

CONNECTICUT-LOUISIANA REPORT.

The official statement of the cost of the two battleships, the Connecticut and the Louisiana, the former built in a government navy yard and the latter by private contract, has been given out by the bureau of construction and repair. The total cost of the two vessels is given as follows:

Connecticut\$6,340,247.63
Louisiana 5,980,322.40

Or an apparent difference in favor of the privately constructed vessel of \$359,925.23.

No mention is made in the report of the fact that the labor done on the government built vessel was performed under the eight-hour system, holidays, half-holidays and leaves of absence, etc., provided for government employes, which in itself would more than make up for the apparent difference in cost.

These two vessels are sister ships and yet in charging up the expenses for each the following items are of interest:

COST OF DRAFTING AND CLERICAL WORK.		
	Connecticut.	Louisiana.
Under bureau of construction and repair..	\$108,520.64	\$34,245.46
Under bureau of steam engineering	31,310.76	12,897.52
Under bureau of equipment	11,622.53	805.28

Just why the cost of clerical work and drafting, which is paid for by the government for both vessels, and is done in the same office and by the same clerks and draftsmen, should cost for the Connecticut \$151,453.93 and for the Louisiana (a sister ship) only \$47,948.26, a difference in itself of nearly \$104,000, is not explained in the official statement.

During the entire time of the building of these two vessels there has been a race as to which should be finished first and which should cost the least. Charges have been made that the contractors supplying the material for the navy yard built vessel frequently delayed shipments, compelling a stoppage of work on the Connecticut, and frequent comment has also been made that the bureau people were not altogether in favor of the private built vessel being beaten and to thus establish a precedent for future building in government yards.

President Roosevelt on his trip to Panama used the Louisiana (privately constructed), that vessel being heralded in official circles as the finest vessel afloat.

The French government has recently conducted tests of petroleum engines for its navy and as a result has recommended the Mietz & Weiss system.

ORIGIN OF SEA TERMS.

There is hardly a language which has not been called upon to provide at least one of the curious sea terms which are in constant use and whose origin is so obscure, says the *Marine Journal*.

For instance, the word "admiral" is not of English origin, but is from the Arabic "emil el gabh," or lord of the sea. Captain comes from the Latin caput, but mate is from Icelandic, and means a companion or equal. Coxswain is a word whose derivation would never be guessed. The coxswain was originally the man who pulled the after oar in the captain's boat, which was known as the cock-boat. This in turn is a corruption of the word coracle, a small, round boat used on the Wye and Usk rivers. So, coxswain comes to us from the Welsh.

Commodore is not so difficult to trace to its beginning. It is simply the Italian commendatore, meaning commander. No such person as Davy Jones ever existed, though we often hear of him and his locker. One should speak of "Duffy Jonah's locker," for that was the original. Duffy is the West Indian name for spirit or ghost, while Jonah refers, of course, to

side of the stern, and the helmsman held the inboard portion in his right hand. "Larboard" was probably a corruption of lower board, the larboard side being inferior to the other.

"The jury mast" has nothing in common with a jury except its derivation from the same word, "jour," the French word meaning a day. The jury mast is one which is put up temporarily—for a day—from the same derivation.

TACOMA LEADS IN LUMBER SHIPMENTS.

Tacoma holds the lead for Puget Sound in lumber shipments for the year past, with Gray's Harbor holding ahead for the northwest. The shipments from the harbor include Hoquiam, Aberdeen and Cosmopolis and Montesano. Aberdeen shipped 229,351,367 ft. of lumber, 53,752,000 lath and 42,022,250 shingles. Hoquiam comes to the front with 98,247,568 ft. of lumber, 18,244,085 lath and 19,350,000 shingles.

Tacoma made a showing in the water business with shipments aggregating 140,524,492 ft. of lumber, 25,247,360 lath and 26,386,000 shingles. The shipments of the various cities run as follows:

	Lumber, Feet.	Lath, Pieces.	Shingles, Pieces.
Aberdeen	229,351,367	53,752,000	42,022,250
Tacoma	140,524,492	25,247,360	26,386,000
Port Blakely	98,523,812	13,212,876	799,750
Bellingham	123,846,357	16,804,540	3,353,250
Everett	97,721,862	15,547,550	1,000,000
Hoquiam	98,247,568	18,244,085	19,350,000
Port Gamble	60,829,588	8,265,861	4,462,750
Port Ludlow	43,828,744	5,175,930	4,066,500
South Bend	35,769,960	3,434,000	.....
Raymond	23,556,610	2,646,250	1,885,825
Seattle	16,115,071	221,000	198,500
Vancouver	8,871,319	1,667,300	.....
Cosmopolis	8,200,912	.....	11,776,750
Olympia	28,756,337	6,762,200	1,230,000
Port Hadlock	37,037,861	7,224,700	1,476,750
Knappton	15,972,125	2,701,560	.....

the prophet.

Another curious case of a term gradually corrupted out of its original form is the dog watch. It was originally the "dodge watch," because it lasted only two hours, instead of four, and thus makes it possible that the same men shall not be on duty every day during the same hours.

Then there is the "sheet anchor," the name given to the largest anchor carried by a vessel. It is really "shote anchor" and is so called because of its great weight, which makes it easy to shoot out in case of emergency.

Instead of the terms "port" and "starboard," which are used nowadays, they used to talk of "larboard" and "starboard." Starboard has nothing in common with stars, but is really the Anglo-Saxon "steerboard" or "steerside," because in all galleys which are steered by an oar the oar was fixed somewhat to the righthand

EXPORTS OF MANUFACTURES.

According to the bureau of statistics the total value of the exports of American manufactures for the calendar year 1906 was \$719,000,000, as compared with \$571,410,497 for 1905. The total of all exports for the fiscal year ending with June was \$2,403,976,551, of which \$1,717,953,382 was domestic products and \$686,023,169 manufactures. In the distribution by countries and grand divisions the percentage which manufactures form of the exports varies greatly, their proportion being smallest in the exports to European countries.

The new Ward liner Havana in spite of the heavy weather encountered, made a fast run on her maiden voyage from Havana to New York, consuming but two days and twenty-two hours in the passage.

PASSENGERS ON ATLANTIC LINERS.

Three records have been established during the past year in connection with the passenger traffic on Atlantic liners. For the first time the number of passengers landed at New York has ex-

ceeded a million, 1,169,551 having entered the states through this portal; and it may be taken that quite a million were immigrants eager for a share of that wealth which is to be made

TABLE I.—AVERAGE NUMBER OF PASSENGERS PER SHIP OF PRINCIPAL LINES.

Line.	First Class.	Second Class.	Steerage.	Total	Total in 1905.	Total in 1904.
North German Lloyd.....	135	252	1073	1460	1387	1201
Cunard.....	133	202	906	1241	918	906
Hamburg-American.....	130	154	1239	1523	1396	1256
White Star.....	121	131	500	752	813	869
American.....	111	160	512	783	788	775
Holland.....	86	227	955	1268	1108	785
White Star (Med.).....	86	193	1731	2010	1479	278
North German (Med.).....	84	169	1439	1692	1511	893
French.....	74	114	789	977	942	854
Atlantic Transport.....	73	...	2	75	76	74
Red Star.....	62	164	1114	1340	1336	971
Anchor.....	58	248	473	779	620	532
Hamburg-American (Med.).....	52	76	1061	1189	818	548
Scandinavian-American.....	44	84	543	671	662	604
Cunard (Fiume).....	39	91	1882	2012	1730	1225
Campania Transatlantica.....	33	47	543	623	662	417
La Veloce.....	29	10	1206	1245	1146	849
Russian East Asiatic.....	28	21	513	562	...	...
Empreza Insulane.....	16	...	375	391	337	139
Lloyd Italiano.....	14	...	1427	1441	563	...
Generale Italiana.....	10	29	1122	1161	1195	717
Anchor (Med.).....	10	...	993	1003	854	543
Austro-Americana.....	9	12	624	645	727	557
Ditto.....	7	13	854	874	...	...
Prince.....	6	...	1003	1009	937	583
Fabre.....	6	...	850	856	835	600
Russian Volunteer.....	5	...	1041	1046	...	...
Mean.....	77	122	857	1056	961	760

ceeded a million, 1,169,551 having entered the states through this portal; and it may be taken that quite a million were immigrants eager for a share of that wealth which is to be made

TABLE II.—RECORD OF ATLANTIC SERVICE TO

NEW YORK.

Year.	No. of Passages.	Cabin.	Steerage.	Total.
1890	...	144,178	371,593	515,771
1891	...	150,023	445,290	595,313
1892	...	120,991	388,436	509,427
1893	975	121,829	364,700	486,529
1894	879	92,561	188,164	280,725
1895	792	96,558	258,560	355,118
1896	852	99,223	252,350	351,573
1897	901	90,932	192,004	282,936
1898	812	86,586	219,651	306,237
1899	826	107,415	303,762	411,177
1900	838	137,852	403,491	541,343
1901	887	128,143	438,868	567,011
1902	922	139,848	574,276	714,124
1903	969	161,438	643,358	804,796
1904	967	162,389	572,798	735,187
1905	1006	184,932	776,330	961,262
1906	1097	218,720	940,831	1,169,551

by industry and otherwise. The remainder were returning tourists. Again, the average number of passengers per ship has exceeded 1,000; and when it is remembered that some of the ships are comparatively small, and that many voyages are made in the winter season with a short passenger list, the fact that the mean per ship was 1,056 proves once more the steadily increasing population of the modern Leviathan. Indeed, the Cunard and White Star liners sailing from Mediterranean ports had an average exceeding 2,000—the one 2,012 and the other 2,010—a figure never before reached by any line. This number has been exceeded by several ships in the height of the season, but as an average it marks a great step forward; because in 1905 the highest was 1,730,

nine in 1905 and three in 1904. It is true that many of these lines confine themselves to steerage traffic; but the same general result appertains to the cabin passenger traffic. The figures of the first two companies in Table I are striking; the North German Lloyd will do still better when this year they have in service their fourth 23-knot steamer launched last month from the Vulcan Works at Stettin. The Cunard line have profited by having the turbine-driven steamer Carmania and the Caronia; while the advent of the Lusitania and Mauretania will have still greater effect. The Hamburg-American line have improved their position by having the immense intermediate

will be noted that, with few and unimportant exceptions, all the lines have increased their average number of passengers per ship.

The totals for a series of years are set out in Table II. Under all headings there has been steady development. Of first-class passengers there were 84,435, against 77,835 in the previous year, 68,704 in 1904, and 67,808 in 1903; the increase in three years has thus been about 25 per cent. In the second class the addition has been still more marked, due in large measure to the superior quarters provided in the modern ship for this clientele. Four years ago the number in this class was 93,630; in the following return the figures remained unaltered. Then there was an advance of 107,097, and now it has reached 134,285—a gain in four years of over 35 per cent. The increment in the steerage traffic is also marked, and the total is three or four times what it was but a few years ago. In the same four years the average per ship has gone up from 830 to 1,056; ten years ago it was only 412.

Our next Table III gives the totals for each line separately. Practically every company has participated in the general advance; we shall leave the reader to note the extent of each company's participation in the greater traffic. The British companies have wrested from continental lines more of the Mediterranean emigrant traffic; and it is gratifying to note that our proportion of the total is fully maintained. As we have seen, the present increasing flow of traffic westward began in 1903. In that year were carried in British ships 37.1 per cent, of the total of first-class passengers; for 1906 the ratio was 38 per cent; of second-class passengers the quota was

TABLE III.—RETURN OF PASSENGERS LANDED AT NEW YORK BY PRINCIPAL LINES.

Line.	—1906.—		Steerage.	—1905.—		Steerage.
	1st.	2nd.		1st.	2nd.	
Hamburg-American.....	14,701	17,775	153,213	10,208	12,901	116,863
North German Lloyd.....	15,566	29,562	149,395	15,974	26,843	135,054
Cunard.....	10,249	16,392	113,351	8,704	12,328	77,387
White Star.....	13,263	15,842	75,413	14,618	13,328	63,489
Red Star.....	3,609	9,501	64,631	3,816	7,560	59,431
French.....	5,884	9,028	62,311	5,066	6,812	55,918
Anchor.....	3,868	12,407	49,469	2,816	8,666	38,433
Holland-American.....	3,868	10,215	42,981	3,267	6,656	42,134
Italiana.....	354	1,002	38,149	455	1,139	35,668
Fabre.....	237	...	33,165	181	...	30,694
Austro-Americana.....	353	528	29,725	154	197	17,125
La Veloce.....	691	245	28,944	768	...	32,476
American.....	5,786	8,328	26,611	5,623	6,733	27,106
Lloyd Italiano.....	204	...	19,969	...	...	...
Scandinavian.....	1,416	2,693	17,366	923	1,904	13,728
Prince.....	91	5	16,051	91	1	14,902
Spanish.....	390	561	6,518	432	614	6,898
Russian Volunteer.....	25	...	5,207	...	...	...
Russian East Asiatic.....	142	106	5,263	...	...	...
Empreza.....	33	...	750	55	...	958
Atlantic Transport.....	3,499	70	4,947	3,590	13	28

ships Amerika and Augusta Victoria, and the French line by having a new high-speed steamer. The White Star line have dropped from first place. It

respectively, 32.4 per cent, against 37 per cent; and the steerage of voyagers, 18.5 per cent, against 26 per cent. The two German companies have not

done so well, having in four years decreased the proportion of first-class passengers carried by them from 37.3 to 35.8 per cent of the total in 1906; their second-class passengers have increased, however, on the same basis, from 37.3 to 38 per cent; but there has been a falling-off in their quota of steerage passengers from 36.2 to 33.2 per cent. There is no doubt that the vessels sailing to and from the south of England have an advantage, and it is consequently interesting to know that the White Star line propose to conduct their principal service from Southampton, with a call at Cherbourg. The German liners call at both ports, in addition to Bremen and Hamburg, which gives a great advantage over Liverpool.—*Engineering*.

GERMAN STEAMSHIP PROFITS.

The steamship companies have begun to announce their business results for 1906, and, so far, these have not come up to the overwrought expectations that the speculating public had indulged in. Earnings, indeed, have been quite satisfactory, but the companies are setting aside large reserve and building funds; and this prevents the increase of dividends. The Hamburg-American line last week disappointed its stockholders by announcing a dividend of 10 per cent, as compared with 11 per cent for 1905.

The recent loss of two fine steamers at Jamaica, however, caused the company to be more careful than usual in constructing its balance sheet for the year. A semi-official statement has been given to the press calling attention to the fact that the profits of 1905 had been swollen by about 10,000,000 marks through the sale of old vessels to Russia and through the transportation of coal for the Russian government during the Russo-Japanese war. Leaving that factor out of account, the earnings in 1906 from ordinary sources rose from 26 to 32 million marks. The company's ocean-going fleet, including eight steamers now under construction, embraces 158 steamers of an aggregate tonnage of 830,000 tons.

The North German Lloyd's business results for 1906 have not yet been officially announced, but it is understood that gross earnings reached 36,000,000 marks, as compared with 33,000,000 marks for 1905, and according to semi-official outgivings the dividend will be 8½ per cent, as compared with 7½ per cent for 1905. The company has ordered seven steamers at German yards, mostly freighters of large capacity. The fourth swift steamer for the New York line, the Kronprinzessin Cecilie, which will be put on during the summer, will be the most efficient vessel of its class, having 45,000 indicated horsepower and making ap-

proximately 24 knots. It will accommodate 729 first-class, 318 second-class and 740 third-class passengers.

The Hamburg-Australian Steamship Co. has announced a dividend of 12 per cent, being the same as for 1905. In view of the prosperity of its business a higher dividend was regarded as probable. The company has just proposed to the stockholders an increase of its capital from 12,000,000 to 16,000,000 marks. The Hamburg-South American Steamship Co., too, has just decided to raise its capital from 11,250,000 to 15,000,000 marks, besides issuing 5,000,000 marks in preference shares. Its total working capital is thus brought up to 30,000,000 marks. The increase is rendered necessary by the recent decision of the company to take over the New York-Brazil connection of the Union line, as well as for the purpose of putting faster steamers on the Hamburg-Buenos Ayres line.

IRON DISTRICT OF THE FUTURE.

The subject of the exhaustion of the Lake Superior ore deposits is an engrossing one and estimates made by various students of conditions generally prove of interest.

E. C. Eckels in the *Engineering Magazine* recently gave his convictions voice. He says:

"The Lake Superior district, at present the leading American producer, has been explored more thoroughly than any other ore field in the United States, but estimates as to total tonnage range within rather wide limits. At present the totals commonly quoted vary from 1,500,000,000 to 2,000,000,000 tons, of which the United States Steel Corporation is commonly supposed to control over three-fourths. This supply is being drawn on to meet a constantly increasing annual demand, and it is conceded that before 1915 the district will probably be called upon to ship over 50,000,000 tons of ore a year. It is obvious that at such a rate the Lake Superior ores can hardly be expected to last beyond the year 1950; and it is equally obvious that long before that date the value of good workable deposits of iron ore, both there and elsewhere in the United States, will have increased immensely. During the past year ore lands in the lake district have been sold at a valuation of \$1 per ton of ore in the ground, though the average valuation is still, of course, considerably below that price.

"With regard to the southern iron ores the case is very different. Here the work which the Geological Survey

has carried on during the past three years, and which was planned so as to obtain data on the quantity of ore available, gives us a fairly secure basis for tonnage estimates. The following figures (in tons) are submitted as representing minimum values for the workable iron-ore reserves of certain southern states, with the caution that further exploratory work in the south will probably increase rather than decrease these estimates:

	Red ore	Brown ore
Alabama	1,000,000,000	75,000,000
Georgia	200,000,000	125,000,000
Tennessee	600,000,000	225,000,000
Virginia	50,000,000	300,000,000
Total	1,850,000,000	725,000,000

"This gives a total estimated reserve for the red and brown ores of the four states noted of 2,575,000,000 tons. If to this we add the ores occurring at deeper levels in the states named, the red and brown ores of Maryland, West Virginia and Kentucky, and the magnetic ores of the other southern states, it is probably fair to assume that the total American ore reserve will amount to very nearly 10,000,000,000 tons—or five times that credited to the Lake Superior district."

MASSACHUSETTS NAUTICAL SCHOOL.

The fiftieth annual report of the commissioners of the Massachusetts Nautical Training School has been issued. The school is maintained by the commonwealth of Massachusetts for the purpose of training young men for nautical pursuits, the duties both of bridge and engine room being given attention. The training ship *Enterprise* is used by the school for practical voyages to various parts of the world. A large number of the graduates of the school during the past 12 years have obtained and held responsible positions at sea and considering the enfeebled condition of the merchant marine the showing is remarkable.

A scheme is afoot for the construction of a canal across Central Scotland, connecting the Atlantic and German oceans—the two most frequented seas in the world. The canal is to be capable of carrying the largest battleships afloat and would extend from Yoker on the Clyde to Grangemouth on the Forth and would be 29 miles long, 36 ft. deep and 120 ft. in width at the bottom.

The Atlantic Works, Inc., 28th street and Gray's Ferry Road, Philadelphia, Pa., recently received an order from the Portland Ship Building Co., Portland, Me., for one of their large dimension planing machines arranged to plane timbers 30 ft. in length.

DECISIONS WHICH AFFECT SHIPPING INTERESTS.

SALVAGE.—The three-masted schooner Rebecca Shepherd, laden with stone, left the port of Rockland, Me., and when 20 miles out stuck on a ledge, and, although she got off after pounding for 20 minutes, was so injured that she began to leak. She started back for Rockland with the crew pumping; but the wind and tide were against her, and the water in her hold was gaining, and she hoisted a signal for assistance. The tug Sea King, which was towing a vessel to sea, on seeing the signal left her tow and went to the assistance of the Shepherd and towed her safely into the harbor of Rockland, where she was beached. There was no other vessel which could have rendered the service, and there was a possibility at least that without it the Shepherd would have foundered before reaching port. The Shepherd and her cargo were sold under process and realized the sum of about \$4,000 net. The value of the Sea King was about \$30,000 and she carried a crew of eight men. Under these facts the United States district court for the District of Maine held that the service was a salvage service, and entitled to be compensated as such; that an award would be made of \$450, of which \$50 should be divided among the crew and the remainder paid to the owner.

The opinion filed in the case states that a court will not encourage a tug to abandon a contract of towage and expose her tow to great danger in order to go to the assistance of another vessel, but such action is commendable where the tow will not be subjected to any special peril of the sea or weather; the case being one in which the master is required to exercise good judgment under the circumstances.

RIGHTS OF SEAMEN AS SALVORS.

Where a ship was in imminent danger of sinking, the captain and crew went on board another ship leaving one man, who being prevented by force from getting into the first boat, afterwards refused to go into the second boat and remained on board and did what he could. He hoisted a signal of distress and was found the next day by another ship which brought the damaged vessel into port. The court held that the departure of the captain and crew from the ship discharged the remaining seaman from all further duty under his contract as far as any act whatever could discharge him, and salvage equal in amount to what was awarded the seamen of the salving vessel was granted him.

The pilot for a vessel injured by fire was entitled to salvage for important ser-

vices rendered by him after the delivery of the ship by the captain into the hands of the master and crew of another steamboat that they might do whatever was expected to assist her. It was held that the pilot's original contract with the boat upon which he was employed was virtually dissolved by its surrender into the possession of the salving ship. But the seamen may have no salvage where it does not appear, unquestionably, that the departure of the master from the ship was without hope of recovery or return. Thus, where the captain and crew of an endangered ship went on board a salving ship in compliance with a demand of the captain that they should do so or he would not give them his assistance, which was absolutely necessary to them, it was held that there was no such an abandonment of the ship by the master and crew without hope of recovery or of returning to her as would vacate the contract of service on the part of the seamen, so that they might be allowed salvage for services thereafter rendered in behalf of their endangered vessel. So, where one of the crew of a fishing schooner remained on board because he considered it safer than to attempt to reach shore, and the rest of the crew went on shore intending and expecting to return when the gale should have abated, it was held that there was no dissolving of the contract relations of the crew which would absolve the one remaining on board from his duty as a seaman, and therefore that he could not claim salvage for anything which he might find necessary to do for the safety of the vessel.

Where, after a collision, all on board left the injured boat under an apprehension that she was sinking, and many went on board the other ship, but the master and a portion of the crew remained about their ship, and, finding that it did not immediately go down, entered on board again and saved a large portion of the property thereon, it was held that there was not such an abandonment of the ship by the master and crew as would change their position and character so as to entitle them to salvage as general salvors.

(To be continued.)

LIMITATION OF LIABILITY DENIED.

Judge Landis at Chicago last week rendered a decision denying the petition of the Merchants' Lighterage Co. to limit its liability as owner of the barge Robert Howlett. In August, 1905, the barge sank in the main branch of the Chicago river with some \$25,000 worth of miscellaneous merchandise on board and was abandoned as she lay in the bottom of the river. A part of the cargo was salvaged in a damaged condition, but the greater part of it was lost. The main

question was on the seaworthiness of the craft. The court held that the evidence established her unseaworthiness and that the benefits of the limitation of liability act could not properly be invoked. C. E. Kremer appeared in behalf of the limitation of liability proceedings and Ray G. MacDonald in opposition to them.

BONUS TO COLLINGWOOD SHIP BUILDING CO.

From Canadian exchanges it is learned that the Public Accounts Committee of the Dominion Parliament last week had up for consideration the question of continuing the payment to the Collingwood Ship Building Co. of the bonus of 3 per cent on cost value of plant provided for by an order in council some years since, it being claimed that the plant was overvalued. In addition to Mr. Jas. M. Smith, the manager of the company, the committee also had before them Mr. L. Coste, of the International Waterways Commission and late chief engineer to the department of public works of Canada, and Mr. Henry Penton of Detroit, who testified as to the value of the plant. It is not probable that the bonus will be discontinued.

PERSONNEL OF D. & C. CO.

A. A. Schantz, general manager of the Detroit & Cleveland Navigation Co., with the approval of P. H. McMillan, president, announces the following appointments:

Passenger department—L. G. Lewis, general passenger and ticket agent; George W. Clark, city passenger and ticket agent; C. L. Sprague, traveling passenger agent; H. T. Ewald, advertising agent; J. B. Plumb, general baggage agent.

Freight department—J. H. Menzies, local agent; M. A. Phillips, chief clerk; T. S. Marriott, local cashier; Frank Ferris, contracting agent.

Auditing department—B. C. Wilder, general auditor; R. G. Stoddard, auditor passenger accounts; Wm. B. Wilbur, cashier.

Commissary department — Louis Thorne, chief commissary.

Purchasing department — Fletcher Sears, purchasing agent.

J. M. Robinson, secretary to general manager.

Martin Sinclair, general foreman of docks.

William Shuter, chief ship carpenter.

Capt. A. J. McKay, commodore of the fleet.

J. P. Wells, consulting engineer of machinery and hulls.

M. W. Mills, Marysville, Mich., has sold the steamer Thomas R. to the Peninsula Tug & Towing Co., Warton, Ont.



DEVOTED TO EVERYTHING AND EVERY
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CIATED WITH MARINE MATTERS
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Published every Thursday by

The Penton Publishing Co.
CLEVELAND.

BUFFALO 932 Ellicott Sq.
CHICAGO 1362 Monadnock Bldg.
CINCINNATI 124 Government Place.
NEW YORK 150 Nassau St.
PITTSBURG 521 Park Bldg.
DULUTH.

*Correspondence on Marine Engineering, Ship
Building and Shipping Subjects Solicited.*

Subscription, \$3.00 per annum. To Foreign
Countries, \$4.50.

Subscribers can have addresses changed at will.

Change of advertising copy must reach this
office on Thursday preceding date of
publication.

The Cleveland News Co. will supply the trade
with the *MARINE REVIEW* through the
regular channels of the American
News Co.

European Agents, The International News
Company, Breams Building, Chancery
Lane, London, E. C. England.

Entered at the Post Office at Cleveland, Ohio,
as Second Class Matter.

March 14, 1907.

THE SHIPPING BILL.

As will be seen by reference elsewhere in these columns, President Roosevelt will make the shipping bill the leading topic in his Indianapolis speech this summer, virtually making shipping the leading issue now before the country. Why shouldn't it be? It is the great unadjusted question. The only sound argument that was made against the shipping bill in congress was one which challenged the fiscal policy of the United States. Granted if we abandon our fiscal policy and abolish protection altogether, American shipping needs no artificial aid. It is the protective policy applied to every industry except shipping which has made shipping in the foreign trade languish. The reason is

obvious. The protective policy has put everything on a higher plane in this country. It has increased the cost of material and increased the wage schedule. There is nothing else on earth except these two things—material and labor. Everything that is created is the product of these two. While many attempts have been made to abolish the policy of protection they have always been successfully resisted and always will be, insofar as it is possible for one to penetrate the future. What we are dealing with, however, is today. The protective policy is the system under which we are at present operating and, in common fairness, if extended to one industry it should be extended to all. It should be extended that it is removed from other industries, it should also at that time be removed from shipping. These facts are so plain that they burn themselves into one's understanding.

The fact that American goods go abroad quite as cheaply in foreign ships as they would in American ships is simply begging the question. A nation is entitled to the carriage of at least one-half of its foreign trade. Normally it should have at least one-half. If it hasn't that proportion there is something wrong. Does anyone for a moment think that Great Britain would permit 90 per cent of its commerce to be carried in the ships of other nations? Its supremacy as a sea power would be gone forever. When the proportion falls below 50 per cent the danger period is approaching. A maritime nation to keep the sea habit alive in her citizens should have a merchant marine capable of taking care of one-half of its foreign trade. The United States has the largest navigable coast line of any nation. It is essentially a maritime country and yet with the largest navigable coast line it has the least number of vessels and carries the least proportion of its own commerce overseas. It hasn't enough ships to train men to replenish the natural wastage in the personnel of our navy, and yet we go on building naval ships steadily.

We repeat that this subject is the most important now before the American people. Interest in it will steadily

grow from now on and while it may receive rebuffs, it will nevertheless gain an increasing number of adherents and it will continue to gain them until a satisfactory shipping bill is enacted into law. This is a movement that can be checked, but it cannot be stopped.

It is related in the cable dispatches that much sorrow was felt in the South American Republics when news reached them that the shipping bill, which meant so much to them, had been filibustered to death in the United States senate.

GOOD WORK OF MERCHANT MARINE LEAGUE.

In a speech made after the launch of the Saratoga, the 18-knot Ward line steamer for service between New York and Havana, which took place at Cramps yard on March 2, Mr. Aaron Vanderbilt, vice president of the Merchant Marine League, paid a glowing tribute to the hard work done by the west in the effort to pass the shipping bill at the session of congress now expired. Mr. Vanderbilt's remarks were as follows:

"The passage, by the house of representatives of the shipping bill is an effort to restore our well-nigh extinct representation under our flag on the high seas, for we have indeed ceased to be a maritime nation, with the example before us of what happens to a nation that has long ceased to cultivate its sea habit and encounters in the contest of war a nation that has a sea habit. The shipping bill will encourage the people to again cultivate the sea habit and may very easily be a saving of the life of the nation in the trial at arms, as it was in 1865 when we had the sea habit, cultivated since the advent of the nation.

"Organization in the middle west has in four years taken up the work of education among the people, to bring them to a realization of the situation. The American Shipping and Industrial League in the south made this effort in 1886 to 1891, resulting in the passage of the mail subvention act. The Merchant Marine League of the United States has now accomplished this from the west, with headquarters at Cleveland, Ohio. The good work should continue until the nation shall again in its history have on its sea habit; and never forget what Sir Walter Raleigh said, as to the strength of the nation that controls the sea."

SITUATION ON THE LAKES.

The strike which is now affecting all the yards of the American Ship Building Co. with the exception of Milwaukee, Bay City and Chicago and the Ecorse yard of the Great Lakes Engineering Works will have no serious influence upon lake trade during 1907. The trade can get along without the vessels on the stocks, and many vessels that were turned over for repair can get along for another season without any alterations if need be. The difficulty on the lakes has never been with tonnage, but rather with terminal facilities. The docks, however, are steadily improving their equipment, and during last year it was common practice to unload a 10,000-ton carrier in one full day. With such dispatch as this the available fleet will be able to handle any reasonable increase in the movement of 1907 over that of 1906. There is no indication of a compromise, the employers feeling that they have the situation well in hand.

The ice fields are quite extensive, and navigation will probably not be in full swing until the latter part of April. There is no profit in trying to force the opening of navigation with the lake steel freighter. Two years ago this was tried at a cost of about \$1,000,000 to the vessel owners. The latest reports are that the average thickness of ice in St. Marys river is 29 in., while the fields in Lake Superior extend beyond vision.

The Pittsburg Steamship Co.'s engineers are at work fitting out, but other owners have not as yet begun to get their boats in shape. No chartering has been done since that which was recently announced.

IRON SITUATION.

Although prices show little change, pig iron has shown an unmistakable evidence of growing strength during the past week. Valley producers of Bessemer pig iron, who have only about 29,000 tons unsold for the first half of the year, have fixed the second quarter price at \$22 furnace. Large interests in the south are very firm in their prices. The monthly blast furnace statistics of *The Iron Trade Review* indicate an average daily production for February of 73,108 tons, against 70,155 tons in January. The urgent demands of the railroads for delivery of rails is indicated by the action of the Carnegie Steel Co. in placing its combination mill at Youngstown on rails after operating it for some months in sheet bars. Official announcement is made of an increase in freight rates, averaging 10 cents on pig iron and all kinds of iron and steel products, effective June 1. An advance of five cents on coke in the Connells-ville district will become effective

April 15. The blowing out of a number of furnaces for repairs has decreased the demand for coke and prices of foundry coke show a sharp decline.

THREE LAKE LAUNCHINGS.

The steamer Thomas Lynch, building for the Pittsburg Steamship Co., was launched at the Chicago yard of the American Ship Building Co. on Saturday last, and was christened by Mrs. Roy A. Williams of Cleveland. The



THOMAS LYNCH.

Lynch is the second of the four 600-footers now building for the company to be launched. This new steamer is 600 ft. over all, 580 ft. keel, 58 ft. beam, and 32 ft. deep. Her engines are triple-expansion, with cylinders 24, 39 and 65 in. diameters by 42-in. stroke, supplied with steam from two Scotch boilers, 16 ft. by 11 ft. 6 in., equipped with Ellis & Eaves draft and allowed 170 lbs. pressure. Her sister ships, the Henry Phipps, building at Bay City, and the George F. Baker, building at West Superior, are progressing rapidly. Capt. E. M. Smith will sail the Lynch and A. L. Eggert will be her chief engineer.

The Toledo Ship Building Co. launched on Saturday last the steamer Charles Hubbard, building for the L. C. Smith Transportation Co. No ceremonies marked this launching. The Hubbard is 460 ft. over all, 440 ft. keel, 53 ft. beam, and 29 ft. deep. Her engines are quadruple-expansion with cylinders 16½, 24, 35 and 50-in. diameters by 42-in. stroke, supplied with steam from two Scotch boilers, 12 ft. 6 in. by 12 ft., equipped with Ellis & Eaves draft and allowed 210 lbs. pressure. Capt. Ralph Lyons of Lorain will sail the Hubbard.

The steamer D. O. Mills, building at the Ecorse yard of the Great Lakes Engineering Works for Pickands,

Mather & Co., of Cleveland, was launched without ceremony Tuesday morning. The Mills is 552 ft. over all, 532 ft. keel, 58 ft. beam and 31 ft. deep. She will have triple-expansion engines with cylinders 24, 37 and 65 in. diameters by 42-in. stroke. Steam will be furnished by two Scotch boilers, 16 ft. diameter and 12 ft. long.

SUBMARINE SIGNALING.

The United States lighthouse board has arranged with the Submarine Signal Co., to equip with submarine bells all important lightships not already equipped. This includes the light-vessels south of Hatteras; those on the great lakes, and those on the Pacific coast. The Point au Pelee lightship, Lake Erie, which is maintained by the Lake Carriers' Association in Canadian waters, has been equipped; and work is in progress on Bar Point (head of Lake Erie); Lake Huron and Poe Reef (Lake Huron); Gray's Reef, White shoal, Lansing shoal and Eleven Foot shoal (Lake Michigan). These vessels will be ready when they go on the station at the opening of navigation. The Pacific coast light-vessels will be equipped as opportunity offers. The five new light-vessels will be supplied with submarine bells before leaving the ship yards. In short the entire coast of the United States is to be protected by submarine signals; and Canada having made similar arrangements, all North American waters will soon have the advantage of such protection.

BULK FREIGHTER J. H. SHEADLE.

No work which the *MARINE REVIEW* has latterly put out has met with a more cordial reception than the book describing the bulk freighter J. H. Sheadle in detail. It gives a complete description of a lake freighter in such a manner as to interest not only the ship builder, but the layman as well. The price is 50 cents. Anyone desiring a copy will have to order it quickly.

Four range lights will be constructed on the Niagara River this summer under the provisions of the bill introduced by Representative Ryan and passed during the last session of congress. These lights will enable vessels to pass Strawberry Shoals at night. One will be placed on the highlands at Germania Park, two will be located on the edge of the water down below and one will be located at the shoals.

Capt. Harris W. Baker of Detroit has purchased the steamer H. B. Tuttle at marshal sale for \$2,500.

SHIPPING A LEADING ISSUE.

President Roosevelt is preparing a speech upon the shipping question. If he completes it in time the president will deliver it at Indianapolis this summer. When the ship subsidy bill was up for consideration in the house this session most of the Indiana delegation was against it, and the president is of the opinion that that state is a good place to begin missionary work on behalf of merchant marine. It is said that the president intends to deal with the subject with unusual vigor and will make as strong a plea for shipping legislation as he did for a larger navy.

In the opinion of the president a large merchant marine is an important part of the naval program. He is determined to put forth an effort to bring about some important shipping legislation and his speech at Indianapolis is apt to be an opening of this campaign. In his next message the president will take up the subject and again urge the importance of merchant marine legislation. It is understood that he will ask the administration leaders in both the senate and house to begin the work of formulating a bill early in the next session so that the situation which developed in the last weeks of the fifty-ninth congress will be avoided. The president was very much chagrined by the defeat of the bill last session and is determined to push a ship subsidy bill through the house so early that it cannot be defeated by filibustering in the senate. Following is the analysis of the Republican vote in the house of representatives on the shipping bill. No Democrats voted for the measure:

ANALYSIS OF THE REPUBLICAN VOTE ON THE SHIP SUBSIDY BILL. S. 529.

State.	No.	Republicans.
California ...	8	All voted or paired for the bill on all votes.
Colorado	3	Bonyng and Brooks voted for the bill—Hogg not paired, not voting.
Connecticut ...	5	All voted for the bill on all votes.
Delaware	1	Voted for the bill.
Idaho	1	First two votes cast against the bill. On the last four calls voted for the bill.
Illinois	24	The following voted for the bill. Madden, Wharton, Michalek, Lorimer, Boutell, Foss, Fuller, Sterling, Cannon, McKinley, Rives, Rodenberg, Smith. All others voted or were paired against the bill except Snapp, who voted but once, being against the bill on the second call, and Prince, who voted against the bill until the final call, when he did not vote.
Indiana	11	Foster, Chaney, Watson, Overstreet, Cromer, Crumacker and Brick voted for the bill. All others voted against it.
Iowa	11	All voted for the bill except Hedge, who on the first two calls voted against the bill and on the last

four calls voted for the bill.

Kansas	8	Scott, Bowersock, Calderhead voted for the bill. The others voted against it, excepting Reeder, who voted against it until the final call, when he did not vote.
Kentucky	2	Bennett paired for the bill, and Edwards voted against it until the final call, when he did not vote.
Maine	4	All voted or were paired for the bill.
Maryland	3	All voted or were paired for the bill.
Massachusetts	11	Gillett, Washburn, Tirrell, Gardner, Roberts, McCall, Weeks, Greene and Lovering voted for the bill, and Lawrence and Ames voted against the bill.
Michigan	12	Denby, Gardner, Smith, McMorran, Bishop, Loud and Young voted or were paired for the bill, and Townsend on the first two calls voted for the bill, on the third against it, and on the last calls voted for the bill. Hamilton, Fordney and Darragh voted against the bill.
Minnesota ...	9	Tawney, McCleary, Fletcher, Buckman and Bede voted for the bill, and Davis, Stevens, Volstead and Steenerson were against it.
Missouri	10	Klepper, Ellis, Bartholdt, Coudrey, Rhodes and Murphy voted for the bill or were paired, and Fulkerson voted against the bill. Shartel voted four times against the bill, on the fifth call for the bill, and on the final call did not vote. Tyndall and Welborn were not paired and did not vote.
Montana	1	Dixon voted for the bill.
Nebraska	6	Pollard, Kennedy and Norris voted for the bill, and McCarthy, Hinshaw and Kincaid voted against it.
New Hampshire	2	Sulloway and Currier voted for the bill.
New Jersey...	9	All voted for the bill except Fowler, who did not vote and was not paired.
New York....	25	All voted or were paired for the bill on every vote except Dunwell, who did not vote until the third call, after which he voted for the bill; and Perkins, who voted against the bill.
North Carolina	1	Blackburn did not vote until the third call, after which he was for the bill.
North Dakota.	2	Marshall and Gronna both voted against the bill.
Ohio	20	Longworth, Campbell, Cole, Scroggy, Keifer, Southard, Bannon, Grosvenor, Taylor, Dawes, Kennedy and Thomas voted for or were paired for the bill. Weber, Weems and Burton against the bill. Goebel voted for the bill up to last call, when he did not vote, understanding the bill had passed. Nevin did not vote and was not paired. Mouser on first and second calls voted against the bill, on third call voted for the bill, and on the last three calls voted against it. Smyser on first two calls voted against the bill, on third call voted for the bill, and after that did not vote. Reidler voted the first three calls against the

bill, after which he did not vote.

Oregon	1	Herrmann not voting, not paired.
Pennsylvania..	31	All voted for the bill excepting Palmer, who did not vote and was not paired.
Rhode Island.	1	Capron voted for the bill.
South Dakota.	2	Martin voted for the bill and Burke was paired for it.
Tennessee ...	2	Brownlow and Hale both voted for the bill.
Utah	1	Howell voted for the bill.
Vermont	2	Foster voted against the bill. Haskins on the first two calls voted against it, and on the last four calls voted for it.
Virginia	1	On the first two calls Slomp voted for the bill; after that he did not vote.
Washington ..	3	Jones, Cushman and Humphrey voted for the bill.
West Virginia	4	Doveney, Gaines and Hughes voted or were paired for the bill. Woodyard voted against it.
Wisconsin ...	10	Babcock, Otjen, Minor and Brown voted for the bill. Cooper, Nelson, Stafford, Esch, Davidson and Jenkins voted against the bill.
Wyoming	1	On the first two calls Mondell did not vote. From the third call on he voted for the bill.

NEW STEAMSHIP LINE FOR MANILA.

The *Singapore Free Press* states that the Ocean Steamship Co., better known as the "Blue Funnel Line," has started a new service to Manila. The steamers run between Glasgow, Liverpool, and the Orient, and formerly had to transship their cargo at Singapore or Hongkong. The first steamer to make the Manila run was the Tencer, the largest freighter that ever passed through the Suez canal. She is a new vessel, built especially for carrying cargo, and is modern in every respect. Her net tonnage is 9,017 and she carried 20,000 tons of cargo. The Ocean Steamship Co. was consolidated with the China Mutual Steamship Co. (owning a number of large freighters) about two years ago. The Tencer arrived at Manila on Nov. 20 on time. Gradually Manila is becoming the American Hongkong of the far east.

A British expedition to the south pole is to leave in October under command of E. H. Shackleton. The party will proceed to New Zealand and thence to the winter quarters of the Discovery, where the shore contingent will be landed, the vessel returning to Lyttelton to avoid being frozen in. She will return the following year for the explorers. In addition to the use of dogs and Siberian ponies for sledge traveling over the ice, a new feature is to be the use of a specially constructed motor car suitable for an ice surface.

LLOYDS STATISTICAL TABLES.

According to Lloyds statistical tables for 1906, the total addition of steam tonnage of the United Kingdom during the year has been 1,493,120 tons gross, and of sailing tonnage 23,404 tons gross, or in all 1,516,524 tons gross. The total addition of steam tonnage during the year has been 1,493,120 tons gross; and, of sailing tonnage, 23,404 tons gross; or, in all, 1,516,524 tons gross. Of the tonnage added to the Register over 95 per cent consists of new vessels, nearly all built in the United Kingdom. The largest item among the other additions to the register are those of vessels transferred from foreign countries and from British colonies to the United Kingdom. These together amount to 63,108 tons.

The gross deduction of steam tonnage from the Register amounts to 588,613 tons; and, of sailing tonnage, to 144,355 tons; or, in all, to 732,968 tons. Nearly 30.8 per cent of the steam tonnage, and 41.5 per cent of the sailing tonnage, included in these figures, have been removed on account of loss, breaking up, dismantling, etc. It should be noted that in the returns of the Registrar-General of Shipping (from which the table is compiled) wrecks, etc., are included according to the months in which they were respectively reported to him, and not, as in Lloyd's Register wreck returns, according to the dates at which they occurred.

The tonnage transferred to foreigners during 1906 amounts to 428,717 tons. The steam tonnage deducted on this account is 347,529 tons, and the sailing tonnage 81,188 tons, or over 59 per cent and nearly 56.3 per cent, respectively, of the gross deductions in each case. The total is 83,984 tons lower than the similar figures for last year. The returns show that 75,549 tons have been transferred to Norway, and 53,419 tons to Italy, within the year under review. Among other countries which have acquired a considerable amount of tonnage from the United Kingdom may be mentioned Greece (48,564 tons), Russia (33,884 tons), and France (30,263 tons). In the main, the vessels which are transferred to foreigners are not of very recent construction. Tables which are included in the Registrar-General's returns indicate that about 15 per cent of the tonnage removed from the Register because of foreign transfer was built before 1880, nearly 36 per cent before 1885, 48 per cent before 1890, nearly 65 per cent before 1895, over 80 per cent before 1900, and over 93 per cent before 1905. In addition to the tonnage transferred to foreigners, 50,208 tons have been transferred to British Colonies during 1906, as compared with 52,464 tons in 1905, 37,464 tons in 1904, and 62,907 tons in 1903. It will be understood that new vessels built in the United

Kingdom directly for colonial and foreign owners are not included in these returns.

On the whole, during 1906, the steamers on the official register of the United Kingdom have increased by 383 vessels, and 904,507 tons, while sailing vessels have decreased by 202 vessels, and 120,951 tons.

The total number of vessels on the register has therefore increased by 181, and the total tonnage by 783,556 tons during the year. This addition appears to be the largest on record.

During 1906, 731 new vessels of 1,493,967 tons, have been classed by Lloyd's register. This is the greatest amount of tonnage classed in any one year during the existence of the society. Of these vessels, 710 of 1,487,005 tons are steamers, and 21 of 6,962 tons are sailing vessels.

With the exception of twelve wood vessels of about 1,000 tons, the material used in the construction of the whole of the tonnage classed was steel.

Sailing tonnage, which formed 25 per cent of the total tonnage classed in 1891, 30 per cent in 1892, only between 1 and 2 per cent in each of the years 1899 to 1901, 5.7 per cent, in 1902, 4.1 per cent, in 1903, 1.3 per cent, in 1904, 0.73 per cent, in 1905, was only 0.46 of the total classed in 1906.

Among the vessels classed during the year, were many of special types designed to meet the requirements of particular trades, including a number of vessels fitted with steam turbines.

The average size of the steamers classed during the past year is about 2,094 tons, and of sailing vessels about 332 tons. Excluding vessels under 200 tons, in order to avoid the diminution caused by yachts, trawlers, etc., the comparative averages for the past few years stand as follows:

	Steam.	Sail.
1906.....	2,417	640
1905.....	2,540	1,437
1904.....	2,428	805
1903.....	2,452	1,518
1902.....	2,733	2,018
1901.....	2,906	2,551
1900.....	2,706	1,580
1899.....	2,807	1,612
1898.....	2,634	1,441
1897.....	2,452	1,741
1896.....	2,555	1,826

During 1906 twelve steamers of over 7,000 tons each have been classed, as compared with twelve in 1898, seventeen in 1900, nine in 1901, twenty-three in 1902, twenty-one in 1903, fifteen in 1904, and fourteen in 1905. With the exception of one, all of these vessels are owned in the United Kingdom. The largest steamers classed were the *Nieuw Amsterdam*, 10,967 tons; *Empress of Ireland*, 14,191 tons; *Empress of Britain*, 14,189 tons; *Araguaya*, 10,537 tons; *Devanha*, 8,002 tons; and *Oriana*, 8,066 tons. No sailing vessel of over 1,000 tons has been classed during 1906.

Of the tonnage classed during the year, 1,353,136 tons, or 91 per cent, have been built in the United Kingdom. Among foreign countries, Germany, Holland, Italy, and Norway have contributed the largest amount of tonnage.

The return includes a statement showing the countries for which the vessels that have been classed were built. 1,110,407 tons, or 74.3 per cent, have been built for the United Kingdom, and 383,560 tons, or 25.7 per cent, for other countries. Among the latter, Germany leads with 108,001 tons; Norway has 43,427 tons; Holland 41,241 tons; Austria-Hungary 27,567 tons; Denmark 27,301 tons; and the British Colonies 23,758 tons.

McARTHUR PORTABLE FIRE ESCAPE.

J. W. Dickinson, formerly of the United States light house establishment and port captain at La Bocacz, writes as follows concerning the McArthur portable fire escape:

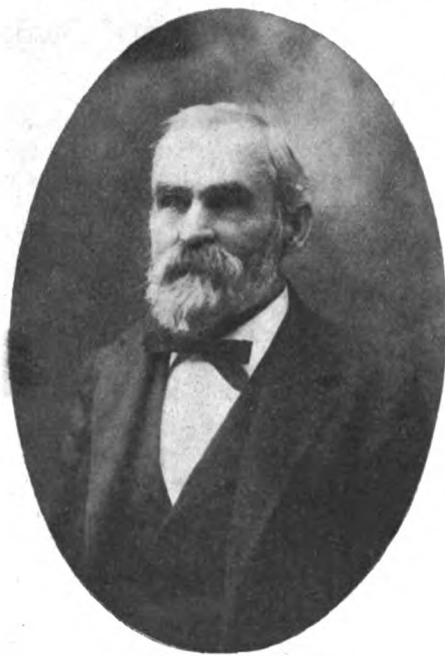
"I, the undersigned, have carefully examined the McArthur fire escape and Jacobs ladder, and honestly believe it to be just suitable for ships of all sizes, to be used for any pilot or passenger boarding a ship at sea or in the harbor. Having had considerable experience as a pilot and ship master, and surveyor for Lloyds in the West Indies and elsewhere, I believe I am competent of offering an opinion. Trusting the traveling public will soon realize the necessity of advocating the use of your ladder."

This ladder will be installed during the coming season on a number of lake freighters and passenger boats. It is manufactured by the McArthur Portable Fire Escape Co., Clark avenue, Cleveland.

Samples of borings from lock sites at Gatun and Pedro Miguel on the isthmus have been received at Washington and Chief Engineer Stevens says in the letter accompanying them: "I have seen press statements lately that these drills have encountered mud and water and material of similar nature. All of these statements are absolutely and unqualifiedly false. The drills have passed through nothing and encountered nothing excepting the material I have described and the samples of borings which I have sent you. Nothing in any investigation which has been made during the last year and a half has tended to show but that the foundations of the Gatun locks will be as solid as the eternal hills and any statements to the contrary are either the products of diseased imagination or willful lies."

DEATH OF HENRY JAMES BLAIR.

In the death of Henry James Blair, which occurred recently at Ashtabula, one of the most competent old masters on the lakes passed away. He had not been sailing actively for several years past, but in the early days his fame extended from one end of the lakes to the other. He was brought up on sailing ships and no man could handle them better than he. In fact, he never sailed but one steamer, the propeller Burlington in 1856. The steamer was not to his liking and he returned to the sailing craft. Capt. Blair was born in McKane, Pa., March 21, 1831, and went to Ashtabula at the



HENRY JAMES BLAIR.

age of thirteen years, making that place his home for the remainder of his life. He was master of the schooner James G. King in 1855 and then commanded for a brief period the steamer Burlington. From the Burlington he went to the schooner Arctic.

It was in the schooner Arctic that he had one of the most thrilling experiences of his life and had he not been one of the most capable seamen that ever walked the quarterdeck, he doubtless would have lost his ship. Tempted by the high rate on grain he left Chicago late in the fall with a cargo for Buffalo. They had a fair run until very nearly off Point Betsey when the wind hauled around to NNE and began to blow a gale. It blew too hard for the schooner to get under the point and Capt. Blair squared away and scudded before the wind under the peak of her foresail and staysail. There was a big sea making which tossed the Arctic about so that she shifted her cargo. After great effort Capt.

Blair succeeded in hoving her to under a close reefed mainsail and staysail. The combers were sweeping the vessel's decks fore and aft, rails full. Capt. Blair ordered the crew to take capstan bars and batter down her bulwarks which relieved her of the weight of water on her decks and gave her a chance to come up and shake herself clear before taking the next dive. Sometimes it seemed as though the vessel would never come up again, but she rode the gale out safely.

From the Arctic Capt. Blair went into the schooner B. F. Wade, following with the schooner New House in 1860, brig Waucoma in 1861, schooner Moranda in 1862, schooner Clara Bell in 1864, brig Rio Grande in 1865, schooner York State in 1866, schooner Wm. Young in 1868, schooner Kate Gillette in 1869, bark Racine in 1871. Capt. Blair was at Chicago in the bark Racine at the time of the great Chicago fire. He later went into the brig Hampton, schooner Bay State, schooner Mary Elizabeth, schooner Hazelton, schooner Jessie, schooner Vampire, schooner Armada, schooner Geo. W. Davis, schooner Oneida, schooner Fayette Brown, schooner Snow Drop, schooner Telegraph and schooner Columbia. His latest active sailing was to take the yachts Say When and Emeline down the St. Lawrence. Of late years he had lived in retirement. He is survived by his widow and four children.

NEW SAILING DIRECTIONS.

Every vessel on the lakes ought to be supplied with copies of the new sailing directions of the Great Lakes which are just being issued by the hydrographic office. These sailing directions have been completely revised on a different plan from the former issues. The editions are entirely new and embody all the changes that have developed during the past few years. Much additional matter has been included and the directions are complete with the latest hydrographic information and exact condition of the improvements of every port and harbor on the lakes. These volumes also contain a practical method for compensating compasses, which should be of great interest to mariners. W. L. Varnum, ensign, retired, United States navy, has issued a bulletin directing the attention of all mariners to the sailing directions. They can be obtained from the MARINE REVIEW and can be seen at this office or at any of the branch hydrographic offices. The following books are now ready for delivery: 108 A, (Lake Superior); 108 B, (Lake Michigan). Lake Huron, Lake St. Clair, Lake Erie and Lake Ontario will speedily follow.

AROUND THE GREAT LAKES.

Capt. J. J. H. Brown of Buffalo has entirely recovered from his recent illness.

Capt. Knud Peterson, of Buffalo, has purchased the lumber barge Buffalo from Adam Hartman, of Tonawanda.

The Lehigh Valley Coal Co. has sold the old Coxe Bros. dock and yard at Milwaukee to the St. Paul & Western Coal Co.

Navigation was opened this week between Sandusky and Kelley's Island by the steamer Lakeside after a battle with the ice.

The steamer John C. Pringle has been purchased by Burns Bros. of Detroit. The Pringle is 173 ft. long and 31 ft. beam.

Burns Bros. of Detroit have sold the steamer Charles Reitz to M. A. Callahan of Cleveland. The Reitz is 127 ft. long and 26 ft. beam.

Repair work on the steamer Binghamton has begun at Buffalo. The steamer requires new deck-houses, new masts and about 135 plates.

The Philadelphia & Reading Coal Co. has let contract to the Duluth-Superior Dredging Co. for the company's new dock to be situated on Superior Bay.

The steamer Duluth, at Cheboygan, Mich., is undergoing repairs this winter to her boilers and machinery, the Cheboygan Boiler Works doing the work.

A revised chart in colors of the south end of Green Bay has just been issued by the United States Lake Survey and is for sale by the MARINE REVIEW.

The steamer building at the Lorain yard of the American Ship Building Co. for the Weston Transit Co., to be named Leland S. DeGraef, will be launched next month.

Captains Henry Warpel, W. H. Moody, George W. Ames and Samuel S. Moore have been elected to membership in the Cleveland lodge of the Ship Masters' Association.

It is reported that the steamer Bulgaria, formerly owned by Corrigan, McKinney & Co. of Cleveland, will be operated by the Sheboygan Transportation Co., Sheboygan, Wis.

A flaw has been discovered in the shaft of the D. & C. Co.'s steamer City of Detroit and the steamer will go to the yard of the Detroit Ship Building Co. where a new shaft will be installed.

Thomas Isabell, the diver who has been at work upon the steamer Nicol, ashore on Summer Island, does not think that the hull of the steamer would be worth the expense of raising and repairing her.

Capt. C. Hardig and J. M. McDonald, of the Miami Lumber Co., of San Francisco, are looking after the rebuilding of the steamers Lucy Neff

and Minnie E. Kelton, which have been purchased for use on the Pacific coast.

The house of Marvin Briggs has been incorporated, capital \$50,000. The directors are: Joseph E. Briggs, 17 Battery place; Francis Fasset Briggs, 47 Cedar street, both of New York, and Marvin Briggs, 1312 Pacific street, Brooklyn.

The Northern Pacific Railroad has filed with the government engineer at Duluth its plans for rebuilding the old Northern Pacific Railway bridge between Duluth and Superior. Two draws are contemplated, giving unusual clearance.

Capt. J. R. Hilborn, of Cheboygan, has purchased the small steamer Ogontz from Mr. J. O. Pickands, who had her on the Les Cheneaux islands route. She is a boat with a stormy career, having been built for "Black Jack" Yattow, of Chicago, in the nineties.

The steamer Alva is undergoing repairs to her engines at Cheboygan. H. A. Blake's machine shop and foundry is doing the work. The steamer, which is owned by the Arnold Transit Co., running from Cheboygan and the Sault, is having her cylinders rebored and new pistons put in.

Capt. Thomas Donnelly, of Kingston, the commissioner appointed by the department of marine and fisheries of the Dominion government to investigate the wreck of the steamer Golspie on Lake Superior, reports that he finds no blame attached to the officers or owners for the wreck.

The Welin Quadrant Davit, Whitehall building, New York, has taken over the sole agency for the United States of the Mills' instantaneous engaging and disengaging gear for life boats, which is represented as being the most economical as well as the most reliable and quickest in action of any of the gears now in use.

Johnston Bros., Ferrysburg, Mich., will build a new mail steamer for C. F. Bielman of Detroit, who has the contract to deliver the United States mails to passing vessels. The new mail boat will be 75 ft. long over all, 72 ft. keel, 13 ft. 9 in. beam and 6 ft. 9 in. deep. She will be built of steel.

Navigation between Cleveland and Detroit was opened last year on March 5 by the steamer City of Detroit. On March 14, however, ice formed in lower Detroit River and traffic was abandoned for over ten days. No definite arrangements have as yet been made for the opening of navigation this year between the two cities.

Mr. J. B. Blanchard, business manager of the lake lodges of the Marine Engineers' Beneficial Association, concluded an agreement this week with R. H. L'Honmedieu, general manager of the Michigan Central railroad at Detroit whereby the engineers of the company's ferries will be given an increase in wages of 12 per cent.

APPOINTMENTS OF MASTERS AND ENGINEERS.

ALGOMA CENTRAL STEAMSHIP LINE.

	CAPTAIN.	ENGINEER.
Str. Agawa	W. C. Jordan	J. L. Smith
" Leafield	Geo. W. Pearson	Jas. Cameron
" Paliki	F. J. Davis	Jas. Gregg
Bge. John J. Barlum	Charles Staley	
Str. King Edward	Wm. Bemrose	Geo. Sylvester

ASHLEY & DUSTIN, DETROIT, MICH.

Str. Frank E. Kirby	A. J. Fox	Julius Holder
Str. Maud	Charles Weitzman	R. H. Wrathell

THE CALVIN CO., GARDEN ISLAND, ONT.

Str. Simla	A. H. Malone	R. H. Veech
" India	Chas. Coons	Thos. Smith
" D. D. Calvin	H. N. Smith	Geo. Hazlett
Sch. Burma	John Ferguson	
" Ceylon	Jos. Ache	
Str. Chieftain	C. E. Phelix	Thos. Gray
" Parthia	D. Lefave	Geo. Sauve
" Frontenac	John Harris	M. Dorrey
" Johnston	O. LeBlanc	Thos. Campau
" Bluebell	John Dix	B. Lappen

CANADIAN LAKE & OCEAN NAVIGATION CO., TORONTO.

Str. Turret Court	Peter McIntyre	C. J. McSorley
" Turret Chief	Malcom McPhee	A. E. Kennedy
" Turret Cape	R. D. Simpson	R. R. Foote
" Scottish Hero	Archie McIntyre	W. H. Durham
" A. E. Ames	E. L. Stephen	Samuel Gillespie
" J. H. Plummer	Jas. Black	Robert Chalmers
" H. M. Pellatt	W. H. Anderson	William Byers

CENTRAL CANADA COAL CO., LTD., BROCKVILLE, ONT.

Str. Samuel Marshall	Henry Russell	Henry Cerow
Str. Eastern States	Duncan McLachlan	J. P. Wells
" Western States	F. A. Stewart	A. Carter

DETROIT & CLEVELAND NAVIGATION CO., DETROIT, MICH.

Str. City of Detroit	A. J. McKay	William Huff
" City of Cleveland	Archie McLachlan	John Hall
" City of Alpena	Mathew Lightbody	A. Phillips
" City of Mackinac	F. J. Simpson	William McDonald
" City of the Straits	Salem Robinson	William Stein

C. W. ELPHICKE & CO., CHICAGO, ILL.

Str. Mary C. Elphicke	Joseph Matthews	Edw. Donaldson
" W. L. Brown	W. B. McDonald	D. W. Rice
" G. Watson French	Samuel Sexsmith	Walter Farr
" John Mitchell	John Massey	S. C. Davis

GRAHAM & MORTON TRANSPORTATION CO., CHICAGO, ILL.

Str. City of Benton Harbor	A. J. Simons	Lewis Sebastian
" City of Chicago	William Russell	William F. Johnson
" Puritan	W. A. Boswell	Byron Beerman
" Holland	John Stewart	R. R. Oliver

ARTHUR H. HAWGOOD, CLEVELAND, O.

Str. H. A. Hawgood	George Robarge	Sam Roswell
" J. Q. Riddle	C. M. Saph	George P. Smith
" Harvey D. Goulder	George McGarry	William H. Stewart
" Umbria	O. J. Solcan	Frank Randall
" Wisconsin	J. D. Greene	R. B. Buchanan
" H. B. Hawgood	A. C. May	Anthony Ward
" S. S. Curry	John Hollingshead	John Lowe

JOHN HOMEGARDNER JR., SANDUSKY, O.

Str. Mary H.	John E. Hess	George Moore
Str. W. R. Stafford	Theodore Grant	J. A. Francombe

HOPE TRANS. CO., DETROIT, MICH.

Sch. Ed McWilliams	A. R. Sharrow	
Str. Theodore Roosevelt	Donald MacLean	Charles Warwick
" Soo City		Harry Irwin

STEPHEN JONES, CHICAGO, ILL.

Str. City of Traverse	Stephen Jones	Edw. Meeh
Str. Alvah S. Chisholm Jr.	Dan Henderson	T. Mahaney
" Albert Y. Gowan	C. Smith	D. Manns
" E. P. Recar	A. Geisendorfer	W. F. Miller
" Clinton	John Steible	Robert Burke
" W. B. Sanders	J. H. Wysoon	Frank Larsen

Bge. D. Moran	W. A. Fetterly	
" J. H. Pellett	William Kelley	
" Norman Kelley	A. Brant	
" Dwight Cutler (Building)	John Robison	

KINSMAN TRANSIT CO., CLEVELAND, O.

Str. M. Andrews	Joseph Lampoh	W. H. Miller
" Philip Minch	L. B. Cummings	Otto Hoffman
" Henry Steinbrenner	Harry Gunderson	R. C. Deforest
" Anna C. Minch	Albert Loher	C. R. Price

ITEMS OF GENERAL INTEREST.

The International Maritime congress of 1907 will be held at Venice the latter part of September.

The Fore River Ship Building Co. delivered the third coast freighter, *Ossabaw*, to the Brunswick Steamship Co., at New York Monday, Feb. 25. Two more of these vessels are yet to be delivered.

The names *Everett*, *Malden* and *Melrose* have been assigned to the three colliers building at the plant of the Fore River Ship Building Co. for the New England Coal & Coke Co.

A quarterly dividend of $1\frac{1}{4}$ per cent on the capital stock of the *Richelieu & Ontario Navigation Co.* has been declared and will be paid March 1 to shareholders on record on Feb. 23.

The Cunard liner *Lusitania* is the first Atlantic liner to be equipped with a branch telephone exchange adapted to make city and long-distance service available when the vessel is in port.

The new steamer *Havana* sailed recently with Charles W. Morse and a party of associates aboard, bound on an inspection of the various fields covered by the Consolidated Steamship lines.

The annual meeting of the Institution of Naval Architects will be held in the hall of the Society of Arts, John st., Adelphia, London, W. C., on March 20. The Earl of Glasgow will occupy the chair.

The Hamburg-American Steam Packet Co. will name one of its new steamships *George Washington*. The vessel is a sister ship of the *Kaiserin Auguste Victoria* which is of 25,500 tons register.

The schooner *Harry Knowlton*, which sunk the *Larchmont*, lost her entire cargo of coal before stranding. The opening forward was of such extent as to cause her to sink by the head, thus spilling the coal into the Sound.

Mr. Linden Stuart has been appointed as inspector of hull work on colliers *Everett*, *Malden* and *Melrose*, building for the New England Coal & Coke Co. at the plant of the Fore River Ship Building Co., Quincy, Mass.

The new steamer *Alberta*, ordered by the Dominion line from Harland & Wolff, is to have a new and improved method of adjustment of the ordinary type of reciprocating engines which eliminates vibration to the same extent as turbine engines.

A fire at Cramp's ship yard recently destroyed fully 70 per cent of their patterns, including those of eight battleships, as well as those for some vessels now under construction. Five buildings were destroyed and the total damage was about \$150,000.

Bidders upon specifications for two tor-

pedo-boat destroyers soon to be built for the government, will probably have the privilege of submitting estimates upon either reciprocating engines of 23 knots speed or turbine engines with a speed possibly as high as 33 knots.

Burmeister & Wain of Copenhagen, Denmark, now have the largest floating dry dock in the Baltic at their ship yard. The dock is 490 ft. long and 77 ft. wide inside although capable of receiving vessels 600 ft. long and of 11,500 tons.

The new battleship *Georgia*, Capt. Richard G. Davenport in command, left Boston recently for Newport, R. I., where she is to take on 300 sailors and apprentices. She then goes to New York for ammunition, thence to Savannah and finally is to join the West Indies squadron.

A report from Athens is to the effect that a new line of three steamers is to be put in service between Piraeus and the United States with a view to increasing emigrant trade from Greece to America and for carrying American goods to Greece, Turkey and the Balkan states.

One of the most interesting sights at the Jamestown exposition will be the historic frigate *Constitution*, better known, perhaps, as "Old Ironsides." This vessel is to be repaired and fitted, so far as possible, as she was when her many victories during the war of 1812 were won.

Printed specifications for the mechanical equipments of the derelict destroyer authorized by congress in May, have been issued by the revenue cutter service. The hull specifications are expected shortly, and bids for the construction of the vessel will probably be asked for soon.

Considerable opposition is developing against a pilotage law in Puget Sound waters such as is now before the legislature of Washington. The bill provides for the appointment of eight licensed pilots to handle all steamers coming into Puget Sound. Steamship owners prefer to select their own pilots.

Work will shortly be begun on the extensive repairs to the battleships *Oregon* and *Wisconsin* at the Puget Sound navy yard and the battleship *Massachusetts* at the Brooklyn navy yard. The repairs consist in the placing of new boilers and electrical installations, overhauling the turrets, etc., and the cost will be \$1,100,000.

The Clyde line freighter *Onondaga* which is ashore outside Cape Cod has so far resisted all efforts to pull her off although satisfactory results are promised for her release. The vessel's position has changed with the tide several times, the work of the wreck-

ers having been considerably lightened thereby.

The International Mercantile Marine Co. has disposed of the Atlantic Transport liners *Missouri* and *Maine* to the American-Hawaiian Steamship Co., thus leaving only four American vessels, viz., the *St. Paul*, the *St. Louis*, the *Finland* and the *Kroonland*, engaged in trans-Atlantic passenger traffic and no prospects for any increase of this number.

A new invention by Capt. J. F. Dundon is a craft for transporting lumber in the form of a skeleton sectional tow barge. The structure carries a million and a half feet of lumber, is 100 ft. long and 40 ft. wide. The craft costs less than \$5,000 and is expected to revolutionize the methods of transporting piles and lumber at sea.

The chief engineer of the French navy, M. Ferrand, has suggested as protection to ships from mines that there should be superimposed upon the actual hull another and lighter hull placed at a distance of a meter from the true hull, and rising above the water line, whereby the gases of an explosion might escape without doing damage to the actual hull of the vessel.

The government trials of the armored cruiser *St. Louis* which took place recently, were very satisfactory. In freezing weather and with a new crew the *St. Louis* ran for four consecutive hours at a speed of 21.7 knots. Her eight hours' endurance trial was in every respect satisfactory. The *St. Louis* will probably be one of the vessels chosen to represent our navy at Bordeaux, France, and she may then be sent to the Pacific station.

It is believed that the battleships *Indiana* and *Iowa* will shortly be dispatched to the Pacific coast to form the nucleus of a strong Pacific coast battleship squadron which will be strengthened by the addition of the battleship *Nebraska* now nearly completed at Seattle. The battleships *Wisconsin* and *Oregon* now being overhauled at the Puget Sound naval station will also probably be added to the fleet with possibly two more from the Atlantic.

The steam schooner *J. Marhoffer*, for Olson & Mahoney, was recently launched at Lindstrom's yard at Hoquiam, Wash. The keels of the steam schooners *Saginaw* and *Claremont*, building for the Hart-Wood Mill Co., were also laid recently at the same yard, while contracts for two other steam schooners are in hand. At the Bendixson yard two steam schooners, the *Yellowstone* for Charles R. McCormick & Co., and the *Tehoe* for M. Turner, are to be completed within three months.

The New York, New Haven & Hartford railroad has advanced the salaries of masters, mates and pilots of its Fall river line boats. The pilots and mates receive on an average \$10 a month increase. The advance to masters affects only those receiving less than \$200 a month, the exact amount not being made public. All the masters receiving less than \$200 are in command of freight vessels. Under the old rates the pilots of the passenger steamers received \$125 a month for the first pilot and \$110 for the second. On the freight steamers the first pilot was paid \$90 and the second \$75. First mates on the passenger boats received \$90 the second mate \$60, and the third mate \$50, and each of these now receives an advance of \$10 a month. The first and third mates on the freight boats, who received \$80 and \$40 respectively, get increases of \$5 a month, and the second mates, who were paid \$50, are advanced to \$60 a month.

The Southern Pacific railroad has asked for bids for the construction of a large car ferry for use on the Mississippi river above New Orleans. The plans and specifications show this boat to be a modern steel side-wheel, car ferryboat, with three parallel tracks capable of handling fifteen of the largest passenger coaches now in use, or twenty-four ordinary freight cars. The length of the tracks is to be 360 ft., while the over-all length of the boat will be 367 ft. and beam 61 ft. The normal draught will be 5 ft. 6 in. The propelling machinery will consist of two radial paddle wheels of 18 ft. diameter and 10 ft. wide, each driven by a horizontal direct-acting single cylinder engine, steam being generated by six fire tube boilers of the gunboat type. Each cylinder will be 34½ in. in diameter with a stroke of 90 in. Each boiler will be built for a working pressure of 160 pounds, the diameter being 8 ft. 6 in. and the length 17 ft. 8 in., giving a grate surface of 216 sq. ft. and a heating surface of 7,500 sq. ft. The indicated horsepower will be about 1,600 and the estimated speed thirteen miles per hour.

The keel of the collier Vestal was laid at the Brooklyn navy yard Feb. 18. She will be 460 ft. in length, 60 ft. beam and 36 ft. deep. The Babcock & Wilcox Co., 85 Liberty street, New York, have been awarded contract for furnishing the boilers of the Vestal and also of the collier Prometheus, the cost for both installations to be \$147,000. The Vestal's engines have been built by the steam engineering department.

MARINE PATENTS.

Copies of these patents can be obtained by sending ten cents in stamps to Siggers & Siggers, patent lawyers, suite 11, National Union building, Washington, D. C.

- 844,372. Life Boat. Carl Lehnert, Marxloh, Germany.
- 844,405. Trimming Weight for Steamboats and the Like. Charles C. Rouillard, Montreal, Quebec, Canada.
- 844,580. Life Preserver. May Cline, Harmony, N. J.
- 844,594. Fishing Net. Frank H. Haskell, Boston, Mass., assignor of one-half to Thomas J. Smith, Boston, Mass.
- 844,837. Nautical Apparatus. Filippo Vanzini, Bologna, Italy.
- 844,925. Fishing Seine. Nealy Elentarius, Biloxi, Miss.
- 844,926. Oar. William Fentzke, Brooklyn, N. Y.
- 841,719. Collapsible Awning for Boats. Alexander Ross, Cambridge, Mass.
- 841,961. Marine Vessel. John F. Gray, Portsmouth, N. H.
- 842,035. Log-Raft Gear. Benjamin S. Spaulding, Arcata, Cal.
- 842,146. Submarine Boat. Richard H. Goldsborough, Washington, D. C.
- 842,195. Marine Torch. Paul Fuchs, Baltimore, Md.
- 842,215. Sail Hank. Magnus Mansson, Helsingborg, Sweden.
- 842,278. Oscillating Blade or Fish-Tail Propeller. George E. Wade, London, England.
- 842,327. Apparatus for Producing Submarine Sound Signals. Arthur J. Mundy, Newton, and Horace B. Gale, Boston, Mass., assignors to Submarine Signal Co., Waterville, Me., a Corporation of Maine.
- 842,338. Apparatus for Unloading Marine Vessels. Charles D. Ross, Milwaukee, Wis., assignor of one-half to Lake Shore Stone Co., Milwaukee, Wis.
- 842,349. Sectional Boat. Norman L. Skene, Somerville, Mass.
- 845,081. Propeller. Andre Hector, East Newark, N. J.
- 845,301. Apparatus for Cleaning Ships' Hulls. George E. Von Hoffman, Chicago, Ill., assignor of one-half to James J. Mullen, Chicago, Ill.
- 845,461. Lighter. John W. Hammond, Taunton, Mass., assignor to Staples Coal Co., a Corporation of Massachusetts.
- 845,477. Boat Releasing Device. Harry G. Oliver, New York, N. Y.
- 845,620. Life Boat. George O. Ditton, Lanoka, N. J., assignor of one-half to Eugene A. Rumsey, Philadelphia, Pa.

GROWTH OF AMERICAN BLOWER CO.

The American Blower Co., of Detroit, Mich., is enjoying such a phenomenal growth that it is worthy of special note. Just at present a large addition to their steel plate fan shop is about completed and will be ready for occupancy in another thirty days and at the same time, the company's architects are at work on a large addition to their power plant and to their engine construction department. This is the way it has been going for some years. One addition has followed close upon the heels of another until the company now, unfortunately, has no ground left to grow on. But a few years ago the engine department of this company was almost a side line, but now, since putting on the market their new vertical, self-oiling engine, which has met with such exceptional success, the engine department is taking first place and is forcing an entire rearrangement of the plant.

ANOTHER NEW HAMBURG AMERICAN LINER.

Telegrams from Hamburg announce that the new steamer of the Hamburg-America line is to be built at Belfast by Messrs. Harland & Wolff. The vessel which will be called the Europa will have a speed of 19 knots. She will carry a crew of 500 and 4,250 passengers. Besides a Ritz-Carlton restaurant, she will be fitted with a winter garden and swimming and Turkish baths. A tennis court is also to be laid on deck.

Tempest No. 1, a wooden steamer owned by H. G. Lester, of Marine City, Mich., has been seized at that port by the United States marshal on a claim for \$325 filed by the Rochester & Pittsburg Coal & Iron Co. for supplies. The Great Lakes Towing Co. has also filed an intervening libel for \$752 for salvage at the time the steamer went ashore on Lake Superior last September. Writs of attachment have also been filed by two Marine City banks.

The Atlantic Works, Inc., 28th street and Gray's Ferry Road, Philadelphia, Pa., recently received an order from the Erie railroad for one of their B-17 adjustable bevel hand saw machines; 40-in. rip-saw benches and 24-in. jointers. These machines are to be used by the company's new boat yard at Weehawken,

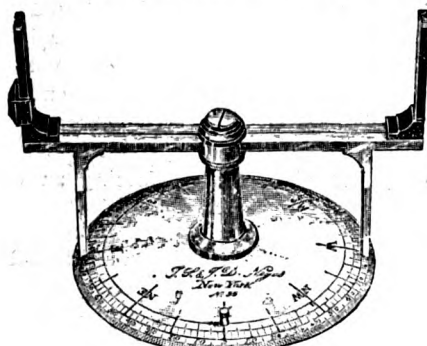
Brown & Co., Buffalo, announce that they have moved from No. 86 Dun building to 1217-19 Chamber of Commerce building.

SCIENTIFIC LAKE NAVIGATION

By Clarence E. Long

THE AZIMUTH ATTACHMENT.

Before explaining the other methods of ascertaining the deviation, which require the taking of bearings quickly and accurately, it becomes necessary first to mention the various devices and instruments used to facilitate the work. The most simple device for this purpose is the azimuth attachment. This consists of a base or frame piece, with an upright at each extremity (called sight vanes). It is arranged so that these uprights are directly opposite each other outside the



THE "ALIDADE."

circumference of the compass. Each upright is slit down its center. In one (the upright next to the object) is stretched a vertical hair or thread, to mark its center; the other upright (the one next to you, or the one you look into) is fitted with an eye-piece, or peep sight. By sighting through the eye-piece and hair one can get an accurate bearing of the sun or any land object. In sighting through the eye-piece and hair the reading of the compass can also be taken from the central mark on the attachment which is in coincidence with the center of the sight vanes. They are made in various sizes, and can be ordered to fit any compass.

The attachment is pivoted to the glass top of the compass by a small pivot bearing on its bottom center working in a small hole or cavity, drilled in the exact center of the glass top (about half way through the glass). This permits the attachment to revolve freely on its axis while held in place.

PELORUS, OR DUMB COMPASS.

Mention having been previously made of the pelorus, a full description of the instrument is given following:

A pelorus is an instrument much used for observing bearings and for finding the deviation of the compass, taking the place of the azimuth compass, shadow pin, etc. It consists of a circular dial of brass graduated with the points and degrees of the compass, and two upright arms (the azimuth attachment, or sight vanes)

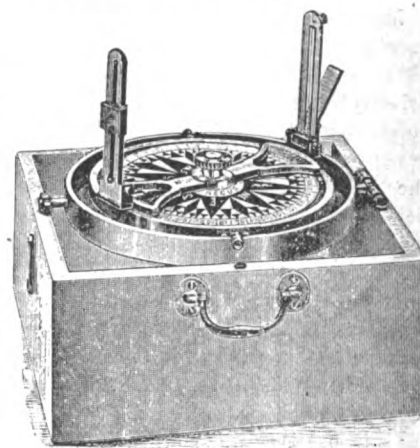
which revolve around the circle. The dial plate, and the plate in which this rests, is hung in gimbals so that it will preserve a horizontal position when the vessel pitches and rolls. One of the uprights is fitted with a perpendicular thread running its length, also a small hinged mirror at its base, and the other upright is provided with a colored eye-screen which is made to slide up and down the length of the arm, and is for the purpose of protecting the eye from the glare of the sun when taking a bearing of that body. A mark on the inner gimbal ring indicates the line of the keel or ship's head, and a clamp screw, on the side of the plate, admits of the dial being secured against turning after it has been set.

The circular dial of this instrument is divided into four equal parts of the circle, commencing at 0 degrees, which is placed to represent the ship's head, and marked 90 degrees and 180 degrees on each side.

In addition to the marking of the points and quarter points of the compass on the dumb card, there are two circles graduated to degrees lying outside of the point and quarter point circle. The first of these degree circles (the inner one) starts with 0 degrees at south to 180 degrees at north on both sides. The second degree circle (on the outer rim) starts with 0 degrees at north to 180 degrees at south, on both sides. Why it is thus graduated will be explained in the chapter on azimuths. The card, or dial, is clamped independently of the bar carrying the sight vanes, so that the vanes, or azimuth attachment, can revolve independently of the card. When the bar with the sight vanes is clamped the card and sight vanes are secured to each other so that one cannot move without the other. To have the card and vanes move as one, can be accomplished by unclamping the dial from the rimmed plate that it rests and revolves in; thus the card and bar can be clamped independently of each other, or to each other at pleasure. The whole is contained in a square box, suspended in gimbals and kept horizontal by a weight of lead beneath the plate. Fore-and-aft (also amidships) marks on the inner ring (the outside rim of the stationary plate of the instrument), does duty as the lubber's point, or ship's head, and another smaller milled-headed screw on the after part of the stationary plate enables the movable dial plate to be clamped to this lubber's mark at any desired course without fear of shifting. The bar with the sight-vanes is clamped to the card by means of a large milled-

headed screw surmounting the pivot. THE INDIVIDUAL PARTS OF THE PELORUS.

The various parts of the pelorus are: The rimmed stationary plate of brass. This plate resembles a shallow vessel with a rim around its circumference, very much like that of a cake tin. This plate is to the pelorus what the bowl is to the compass. Secured beneath this plate is a perpendicular brass rod several inches long on the end of which is the lead weight to keep the instrument level at all times. On the top center of the plate there is a pivot of the same diameter all the way through. There is a hole through the center of the dial plate to fit this pivot. The dial plate revolves about this pivot in the rimmed plate. A thumb-screw through the side of this rim secures the dial plate to any reading by merely setting up on it causing it to jam or clamp. The dial plate is unclamped in the same manner. There is a tube or sleeve piece fitted around the central hole of the dial plate of the same length as the pivot bearing of the fixed plate. The dial plate can be lifted out of the fixed plate at will. A screw with a shoulder enters the top of the pivot and prevents the dial plate from being raised. This screw has to be removed before the dial plate can be lifted out. In the top center of this same screw there is an aperture with a thread like that of a



THE PELORUS.

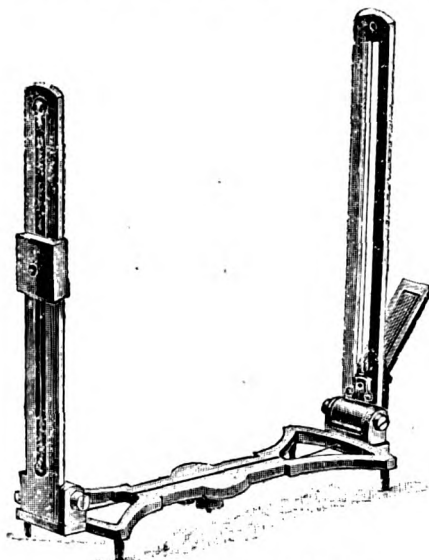
nut, for receiving a stile or shadow pin.

The azimuth attachment revolves about the sleeve pivot of the dial plate. The large thumb screw on the top of the instrument clamps or unclamps the azimuth attachment to the dial plate. To have the dial and sight vanes revolve together, clamp the attachment and vanes by means of the screw on top and unclamp the screw on the side of the rim. To revolve, or set the attachment alone, unclamp the top screw and clamp the

side screw. To revolve or set the dial, unclamp both screws. A brass washer with a rimmed edge separates the dial from the attachment so that one does not interfere with the working of the other. The whole thing is so simple that anyone looking at it can understand the arrangement in a few minutes.

THE INVENTOR OF THE PELORUS.

The pelorus is the invention of Lieut. Friend, an English naval officer, and while simple in principle and construction, its utility is so great that every ship should be provided with one. With this useful instrument ship masters can easily and quickly determine the deviation of their compasses. It can be used any place on board where an unobstructed view is to be had. The attachment fitted on top of the standard compass, such as the alidade, and other instruments, cannot be employed as can the pelorus; for so soon as the ship's binnacle containing the compass, or any compass on board, was shifted from one position to another, the magnetism of the ship would bear different relations to the magnetic needles of the compass. Not so with the pelorus, which is non-magnetic. The pelorus is purely a bearing instrument, and its advantage and convenience lie in the fact that it can be employed in getting the bearing of an object from any certain compass whose view is obstructed by masts, smokestacks, etc. It



AN AZIMUTH ATTACHMENT.

is, of course, used in conjunction with a real compass. It is a dummy and really takes the place of the steering or navigating compass during the time that the bearing is being taken.

WHY IT IS A DUMB COMPASS.

The pelorus is really a substitute for any compass on board from which a bearing is to be had or taken of a land object or of some body in the sky; for it must be plainly seen that if the compass dial of the pelorus is set to the

same heading as that of the steering compass (if this is the one you wish to take the bearing from—it makes no difference which one you use so long as you set the pelorus to the same reading or heading), the bearing by pelorus must be precisely the same as though it were taken by the steering compass. We further know that it would simply be impossible to get a bearing by the steering compass even though that instrument be supplied with an azimuth attachment or bearing indicator, on account of being hemmed in by the sides of the pilothouse. Hence, the truthfulness of the statement that the pelorus can be employed where the compass cannot, and in this lies its chief merit.

NOT NECESSARY TO OCCUPY PLACE OF COMPASS.

It must be understood that it is not necessary to set the pelorus up, or to have it occupy the same position of the compass you are using it for. The pelorus can be set up in any part of the ship, so long as its fore-and-aft marks are set either in the line of the keel, or parallel therewith. The principle of the pelorus is merely this, it measures the horizontal angle between the object and the ship's head.

THE DEV. OF ANY NUMBER OF COMPASSES.

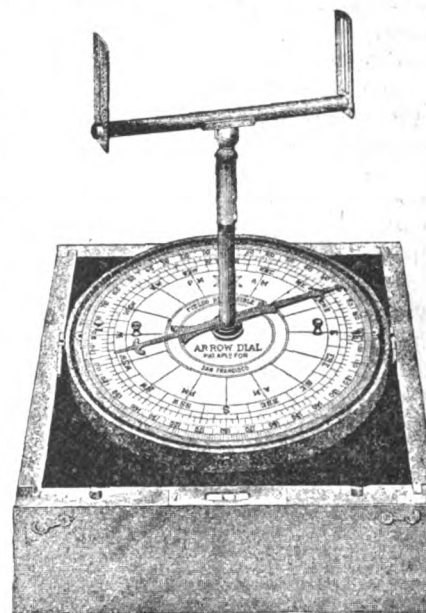
It is also possible by means of the pelorus to steady the ship's head to any desired course and to determine the deviation of any number of compasses on board at the same time and as easily as in getting it for one compass. No other instrument can perform this feat.

In taking land bearings (at short range) the pelorus must be set up somewhere near the compass that the pelorus is taking the place of. This is for the purpose of reducing the angle from the object to the position of the compass and that of the pelorus. In case the shore object is close aboard, the bearing by pelorus, if far removed from the compass it is set to, may make a sensible difference in the two lines, if taken from one or the other, that is, if the bearing were observed from the compass station, or from the pelorus station. Where the object is at a considerable distance from the ship (5 or 6 miles) the difference in the angle should be of no account. The pelorus can be placed anywhere on the bridge without trouble from this cause, with the sun or a star, this would make no difference whatever.

A CARD WITHOUT NEEDLES.

The card of the pelorus is what is termed "dumb card"—that is to say, a compass without needles—made of brass, entirely unmagnetic, and not partaking in any way of the compass, except that its face shows the points and degrees in the usual manner. The card is something less than 7 in. in diameter. It would be an improvement to have the card 9 in.

in diameter, to get larger marginal divisions, so that bearings of the sun could be determined more minutely than with a smaller card. Where the vertical mark (lubber's mark) on the bar carrying the sight vanes meets the edge of the card, read off the bearing, the card is either clamped to the ship's course, or the



FIELD'S PELORUS.

course that the ship is desired to steer. How to use the pelorus with the sun is fully explained under azimuths.

IMPROVED PELORUS AND AZIMUTH.

An improved pelorus and azimuth attachment is that made by Negus. In this instrument the compass face or dial (showing the points and degrees) is made of a glassy composition, like that of a watch dial, instead of a paper dial, which a good many of the older kind contain. Rain or snow has no effect on it, and easily admits of coal and grain dust, and the like, to be cleaned off its face without the least trouble. This face is a great convenience, for it becomes absolutely necessary to use this instrument in every kind of weather. The degrees and points on the card are clear and well-defined, and will always remain so. The instrument must, of course, be handled with a certain degree of care, to prevent the glass dial from breaking.

HOW THE SUN'S SHADOW IS MADE.

The improved azimuth attachment has, instead of the sliding eye-piece, a prism-glass, hinged so that it can be set to any angle, and the sun's bearing is made by reflection. The prism focuses the sun's reflection to a bright perpendicular shadow like a pencil line. This shadow line is about an inch high, and about the width of an ordinary lubber's mark. On the reverse upright of the attachment from the one carrying the prism, and near its base is a perpendicular slit fitted with another mirror, and when the re-

flected ray of light shines into this slit this mirror conveys by reflection this fine shadow to the circumference of the compass dial indicating the sun's bearing, which can then be read off. When the reflected ray of light coincides with the perpendicular slit it shows that the sight vanes are pointing right for the sun's center, or that the vanes and sun's center are in transit.

THE SHADOW CLEARLY DEFINED.

As the background on which the reflected shadow is thrown is painted black, the shadow is clearly defined, even when the sun is so dim as to hardly cast a shadow. The convenience of this instrument is ten-fold, inasmuch as no squinting and bending over is necessary on the part of the observer, but on the contrary, he can stand upright in a perfectly natural position. Neither is it necessary for him to put his nose or cheek on a quadrantal ball, on a cold day, for instance; nor is there any chance of the sun's brightness shining in the observer's eyes and blinding him for the time being. This attachment also carries the sight vanes above the mirrors, for the taking of land bearings. This attachment can be fitted to any pelorus or compass in place of the ordinary azimuth attachment. It is very simple, handy and practical. It is strongly manufactured and will stand the wear and tear of years. This attachment reads from the side on which the object bears, not having to reverse the readings as in some azimuth instruments.

DO NOT GET THE NAMES MIXED.

The pelorus must not from a similarity of names be confounded with another invention, known as the palinurus—so called after a famous old Greek pilot—nor with the polaris, both of which are totally different instruments. The pelorus will again be referred to both in azimuth work and compass adjustment.

CHEAP-JOHN INSTRUMENTS.

There are a number of cheap-John instruments now before the public which profess to be "compass correctors." It is not proposed to discuss their relative merits; but presuming them to be right in principle, which is open to question, it would be better if they were termed "compass course correctors," or "deviation detectors," as the former name is quite inapplicable. These instruments are mostly slapped together and of such light construction that if by chance they get a knock or fall, it would be difficult to re-adjust them. Whereas the construction of the pelorus, while correct in principle, is so extremely simple in detail that any ordinary deck-hand could "put it to rights" without half trying.

FIELD'S COMPASS COURSE CORRECTOR—ARROW DIAL SLIDE.

Fields' Course Corrector is another instrument of merit and worthy of consid-

eration. Its principle is that of the pelorus, only that there is a little more to it in the way of attachments. In some respects it is an improvement over the pelorus, the movable variation circle being one of them. The true and magnetic dials are set similar to that of the pelorus, and either the true or correct magnetic bearings or courses can be read off at once. By means of the variation circle that correction of the compass is eliminated from the problem.

The sight vanes of the instrument (see illustration) are used in the same manner as the azimuth attachment. For the sun, its image is reflected in the speculum and bisected by the perpendicular thread in the other vane. This attachment is hinged at its center and can be worked up or down (in the vertical plane) as well as to turn it, and it can be adjusted to any angle of altitude, as in case of the sun and stars. It is an excellent device for "catching" the north star (getting its bearing). The arrow below is, of course, always in coincidence with the vanes, and indicates the bearing. To set a bearing place the arrow to the bearing at the circumference of the dial and look through the sight vanes until the object is seen through them. Be sure to have the compass dial set to ship's head according to the compass you are using. To take a bearing: Having the dial of the instrument set to the ship's head as already stated, bring the sight vanes to the object and read off where the arrow coincides with a degree graduation on the dial, which will be the bearing.

Fields' instrument, although strongly constructed and durable, is only about half as heavy as the regular pelorus. For this reason it is more easily carried around and cared for.

PELORUS STANDS.

Suitable stands for the pelorus should be provided on different parts of the deck in order that bearings may be taken at any station by simply carrying the pelorus to it and setting it on its stand. The idea of this is that if the view is obstructed (by a mast, funnel, sail or deckhouse) from one point, another may be selected which will give a clear field. It is recommended that steam ships have stands built at each end of the bridge and one somewhere near to the standard compass, if practicable. These stands require to be but simple shelves fastened to the rail or some such place, and provided with raised strips or coamings of wood running round them for the pelorus box to snugly set into and to protect the same from rolling off. The stands must have their fore-and-aft coamings parallel to the ship's keel, so that when the pelorus box is placed, the zero line (the lubber mark) of the instrument will either coincide with the line of the keel,

or be parallel therewith. The manner of effecting this is explained in the following:

The ship being on an even beam while in dock, or at anchor, or moored to a landing, set the pelorus square on one of the shelves, with the lubber's mark forward, and measure carefully the distance from the lubber mark of the instrument to the midship seam of the deck, then lay off toward the bulwarks from this seam a conspicuous mark on the forward deck (on the side that the instrument is on) the same distance as exists between the pelorus and the seam. Next set the zero points of the pelorus dial to the lubber's mark of the instrument, and observe that the sight vanes are placed at zero. Look forward through the sight vanes at the mark made, and move the box one way or the other until the mark is seen to be cut by the thread. Now secure the coamings on the lines indicated by the box, and proceed in like manner for each one of the shelves.

In a vessel or steamship, there are many things which give true fore-and-aft lines, as well as athwartship ones; but the intermediate angles are wanting. The pelorus supplies this deficiency, as it enables us to measure any angle between the beam and the fore-and-aft line. And this is the view which must be taken of it. You must divest yourself of the inclination to consider it a compass; to repeat, it is merely an instrument for measuring the horizontal angle between any object and the ship's head. Dumb cards without gimbals give incorrect—sometimes very incorrect—results, and should on no account be employed.

The places selected for the pelorus stands need not be amidships on the fore-and-aft line of the ship—in fact, they are better when not so; but, wherever they may be, it is absolutely necessary that great pains should be taken to insure the fore-and-aft lines of the instrument being strictly parallel with the ship's keel.

HOW TO SET THE PELORUS TRULY.

To effect this with certainty (the pelorus being in its intended position—say on either the starboard or port side of the bridge), measure carefully the horizontal distance of its center from the midship seam, and lay off this distance on the deck, as already explained, both at the bow and stern end of the vessel. At each such place erect a batten and see that it stands perfectly plumb; the ship herself is, of course, supposed to be on an even beam; then set the north point of the card (though any other point will do just as well) to the lubber line of the instrument, and clamp it there by the milled-headed screw at the after side; release the sight vanes, if clamped (by the screw on top) and turn it so that the center mark at the base of the upright

holding the thread may also coincide with the north point; place the box by eye approximately square with the fore-and-aft line of the ship, taking care, of course, that the lubber's point is forward; now look from aft forward through the sight vanes, and slew the box slowly one way or the other till the batten at the bow is seen in one with the thread.

When an exact coincidence is established, the result thus far is satisfactory; but to render it completely so, turn the sight vanes half round on its axis without removing the box in any way, and set it to the south point of the card. If now, on looking at the after batten, it should be found to be exactly in one with the thread of the vane, all is well, and the fore-and-aft line of the pelorus coincides truly with the fore-and-aft line of the ship.

TO TEST THE ACCURACY OF THE STANDS.

The instrument must now be secured in this position by an all-round coaming about an inch high, forming a seat into which the box can at any time be shipped without further trouble. Bore a couple of holes through the coaming in each of the sides to act as scuppers. If at any time that the ship should be in dry dock, and from which some distant object (so far away that the distance between the pelorus stands from one side of the bridge to the other, will make no sensible difference in its real bearing) can be seen, it will be very easy to test the relative accuracy of the stands by the following process: Place the pelorus in any one of the stands previously put up; clamp the north point, or any point for that matter, of the card to the lubber line, and, looking through the sight vanes at the distant object, ascertain its bearing to the nearest quarter degree; remove the instrument to each of the other stands, and if the various bearings agree, it is evident that the fore-and-aft line of each station is also in agreement. If one then should disagree and two of them agree, then the one out of line should be made to coincide with the others. If it should happen that none of them agree, then recourse must be had to the batten method.

It must not be understood from this that the pelorus gives the real bearing of the distant object; it merely gives the horizontal angle between the object and the ship's head. The term "bearing" is in this case used merely for convenience.

HOW TO TEST THE STANDS BY THE SUN.

If there be no suitable distant object, use the sun instead, if it is to be seen, since you can, if you are smart, use it as the distant object. The sun's bearing will seldom alter enough in the minute or so required to shift the instrument quickly from one place to the other as to introduce any appreciable error; but if extreme accuracy be required, it is easily gotten at. Wait until the sun is very

low (near the horizon) and then take your bearings; for at that time the sun hardly changes its bearing one degree in five minutes. Of course, you understand that the vessel is supposed to be stationary between the times of bearings. A good time to test this is when the vessel is in dry dock. If lying at a dock see that she maintains the same position for the different sets of bearings. If the vessel is loading or unloading be careful that the sets of bearings are for the ship in the same position.

The pelorus should not be set by squaring up from its box, but from its lubber marks as already explained. It is all right to start it that way, and then to re-adjust it by the lubber marks.

IT IS HARD TO STRIKE IT.

It is usually a very difficult matter to strike the fore-and-aft line of the ship and get it accurately, that is, truly with the ship's keel. The masts are not always stepped exactly in the fore-and-aft line of the ship; and these, too, are not always available from the position that is intended for the pelorus. It is usually on top of the pilothouse, or bridge, that the pelorus is to be used; and to transfer this line from the deck to the bridge is no easy matter. The coamings, stanchions, etc., of the bridge, are seldom true fore-and-aft, or parallel with the keel or with a true 'thwartship line, so that it is not always advisable to line up from these without first verifying that they are right. On steel boats there are no deck seams (deck seams are not always accurate, either) so other means have to be devised. Probably the best way to do this is by laying off a couple of cross sections between the pilothouse and stem (on the fore-castle deck). Measure straight across in front of the pilothouse from side to side; find and mark the center. Do the same thing again, but this time pretty well forward, say about 12 feet from the stem. A chalk line struck from these two central points will give the fore-and-aft line of the ship. This line may be transferred to the bridge by battens and plumb-bob, as already described.

When the true fore-and-aft line of the ship has once been determined, it would be wise to mark it in some distinguishable way so that if it ever becomes necessary to refer to it at any future time it can be done so and very easily at that.

WRONG STEERING WILL BE THE RESULT.

One not familiar with such matters would not dream, let alone think, that such a small thing as setting up the pelorus so that the fore-and-aft lines did not agree exactly with those of the ship's, or parallel thereto, would materially effect the bearings taken to determine the deviation. But, nevertheless, a small error of this kind will produce a large error in the bearings, especially bearings

for the deviation. The pelorus as thus used really represents the compass that you are navigating the vessel by, standard or steering, and you know that if the steering compass is incorrectly placed, that wrong steering will be the result and, too, that it does not have to be much out of the way in order to make a quarter point difference in the course; and what is true of the compass is likewise true of the pelorus. Neglect to properly observe the foregoing rules of placing the compass, or other instrument, according to the fore-and-aft lines of the ship, have led vessels ashore.

Some of the old-style peloruses have adjusting screws on the bearings for moving the instrument, that is, the dial plate, bodily from one side to the other, so that if it becomes necessary to turn the instrument without turning the box, it can be done by means of these screws.

WHEELHOUSE AND TEXAS OUT OF LINE.

It is very seldom that the wheelhouse, texas and cabins are exactly in the center of the ship; that is to say, if one were to find the center of the wheelhouse, texas or cabin, this central line would not coincide with the midship fore-and-aft line of the ship. We know of some of the finest boats on the lakes to have their cabins and wheelhouses two and three inches out of line. We have found the speaking box five and six inches too much to one side. Only a short time ago in placing the steering compass in a new boat we found that there was nothing true on board. First we lined up from the after wall of the pilothouse, which, judging from the eye, would give a true athwartship line. When the compass was set up from this line it did not agree with the base and frame of the steam steerer. A line was then run from stem to stern and the compass was set up according to this line. This line disclosed the fact that the wheelhouse and cabin and steam steerer were all out of line and that boat was wider on one side than the other. It is a fact that ship carpenters and joiners do their work more from the eye than from actual measurement.

AN EXPERIENCE THAT ILLUSTRATES IT.

On one occasion, not so very long ago, while the writer was adjusting the compasses of one of our large lake steamers, and was making the run with her, an error of this kind caused any amount of trouble and anxiety (to us if no one else) until discovered.

It was on the run from Chicago to Point Betsey. The pelorus used set and swung on a brass standard, which was secured to the bridge deck. The fore-and-aft line of the vessel was determined and laid off, and the stand set to it (the base circle of which is divided into four equal parts representing the fore-and-aft and athwartship lines which coincided with the same marks on the instrument).

Every preparation for adjusting the compasses was made before leaving Chicago (these details are mentioned here merely to show what an easy matter it is to make a mistake, while doing everything in your power to guard against it). It was late in the afternoon when we got outside and swung the vessel for adjustment, and as there was not sufficient time before the sun would dip below the horizon, only the steering compass was adjusted; and this for lack of time was only adjusted for semi-circular deviation. About 20 minutes before sun set the vessel was put on the usual course for Point Betsey, by means of the pelorus and sun's azimuths (the c. m. c. N by $E\frac{1}{4}E$) and when steadied the steering compass showed N by E. During the next 10 minutes three different azimuths were taken, and the last one showed that the compass was affected by $\frac{1}{8}$ point Wly. Dev., and instead of showing the ship's head c. m. N by $E\frac{1}{4}E$, it showed it to be N by $E\frac{1}{8}E$ (the man at the wheel was keeping her steady on N by E all the time as he had been told). The course was altered to N by $E\frac{1}{8}E$ (ported an eighth) to counteract this. Right here then showed what we have mentioned, namely, that the ship's magnetism, in some cases, is slow in changing and acquiring new relations with the earth's inductive forces, when the vessel's head is considerably changed in azimuth, as was the case here. It was fully 10 minutes that the vessel was steadied on this course before this error was discovered, which showed that the vessel's iron had not passed through the various phases of magnetism and settled down to a permanent state as soon as it should have under ordinary conditions.

This goes to show that in determining the deviation of the compass that when a vessel is steadied on the course even so long as five minutes, that the time is insufficient in some cases. This is a point which wants to be remembered by the student as well as the navigator, and is something that but very little attention is paid. To go on with our story: THE COURSE WAS VERIFIED BY THE NORTH STAR.

That night the course was verified by the north star by the pelorus and found to be correct. We were due at Point Betsey along about noon the next day. As it was hazy Little Point Sable was not seen on the course, at least it was not reported, and if it had been it was too early in the mid watch to have turned out to get its bearing. The loom of the land at Big Point Sable was seen, but no bearing could be taken on account of the haze. It looked farther off than it ought to, but there was no proof of this, inasmuch as we were more than certain that the vessel was making the right course (she was making the course all

right according to figures, but it was not the one we were figuring on). We passed several boats that were inside of us some five or six miles, that were supposed to be steering the Chicago course (and they were, too), but as we were steering by our own compass and not by the other fellow's, we did not let this bother us, though it set us to thinking; another thing, we were on the deep water side of our point of destination (according to the other fellows), so that stranding, or a chance of stranding, was out of the question. As the sun's bearings, for which the course was set were taken under the most favorable circumstances (when the sun had a low altitude) we could see no good reason why we were not on the right track, notwithstanding all these unfavorable signs. But when Point Betsey was made we were some 11 miles off when abeam, instead of four miles, or seven miles wrong. Here was a puzzler. We were almost positive that the course was set right at the start. A mistake could very easily have been made in the watch time for the azimuths, but as this had been verified a few hours before leaving Chicago this was out of the question. Current was suggested as being the cause, but as there were no indications of current, as judged from the weather we had had for the past 24 hours, and from present conditions, this was dispelled. However, we went diligently to work in an endeavor to locate the real trouble. The azimuth work was examined and found correct. The steering compass was looked over, and the wheelmen questioned in regard to several matters; the pilothouse was next looked over to see if anything had undergone a change from the day before, and here everything was apparently all right. It must have been in the steering, but whatever it was we were afraid that it would never be brought to light. We next verified the amidship fore-and-aft line of the vessel to see if the steering compass was parallel therewith. This was found correct enough. We next examined the pelorus stand to see if this was correctly placed, and here we were rewarded for our pains, for it was found to be considerably slewed from a line parallel with the fore-and-aft line of the ship; and as afterwards proved was the whole cause for the wrong steering.

As the sun was still very high (a little after noon) and not favorable for azimuths, nothing was done until in the vicinity of South Manitou Island. During the meantime a set of azimuths was tabulated for a certain position (off the light) and at the proper time the vessel was swung to resume the work of adjusting the compasses. The pelorus stand was not touched, but remained in its place, though correct lines were drawn so that when the time came for chang-

ing it it would only take a few minutes to do so. When the time came for taking the azimuths the first thing done was to put the ship's head correct magnetic N by $E\frac{1}{4}E$ by the pelorus and the course by steering compass compared. After being thoroughly steadied on the course the compass showed the same course that we had steered from Chicago to Point Betsey, namely, N by $E\frac{1}{8}E$. This was sufficient proof that the pelorus was the cause of the trouble and in order to be doubly sure, the pelorus stand was moved to its correct position, and the ship's head steadied again c. m. N by $E\frac{1}{4}E$ by pelorus. When sufficiently steadied on this course the steering compass read N by $E\frac{1}{4}E$, little easterly (good 2 degrees difference). As we were about seven miles farther off Point Betsey than we should have been, an error of 2 degrees on this run of 200 miles would just about make this, which again was convincing proof.

This then goes to show what a little carelessness on our part in not verifying the position of the pelorus stand after it was fastened to the deck. Here no trouble came of it, but there are many times when this much of an error would lead to serious trouble. We were almost positive that the vessel was on the right course from the fact that everything done was performed under such favorable circumstances. There was nothing wrong with the course according to the figures; and she was making the course according to these figures, but not the one that we were figuring and counting on. This same experience taught us an excellent lesson, and that is, that it is not liable to occur again. After the compasses were adjusted and the boat swung for a table of residual, or remaining corrections, no trouble was experienced in making good the courses shaped according to these corrections.

The alidade is a modification of the pelorus, but is fitted on top of the binnacle, and can be removed at pleasure.

It is used as an azimuth for the correction of the compass, and is especially adapted for taking bearings of land objects. It is simple and strong and is made to fit any binnacle top.

The instrument is made entirely of brass, and is, therefore, non-magnetic. The dial plate and the cross bar carrying the sight vanes work independently of each other, and either of them can be set to any reading at pleasure. The feet, or down rights, from this cross bar acts as an indicator for reading the bearing on the dial. Their centers are marked so that by following the line down with the eye, it will show where it cuts a division on the dial and the bearing is thus read off. This instrument is nothing compared with the pelorus.

**QUESTIONS FOR WHEELSMEN
AND WATCHMEN.—NO. 33.**

336. Give correct magnetic course and distance from a point 4 miles north of Point Betsey light house to entrance of Sturgeon Bay ship canal.

337. Give correct magnetic course and distance from a point 2 miles north of Manistee harbor entrance to Manitowoc harbor entrance.

338. Give correct magnetic course and distance from Ludington to Manitowoc harbor entrance.

339. Give true course and distance from Sheboygan to Grand Haven harbor entrance.

340. Give correct magnetic course and distance from Milwaukee harbor entrance to Muskegon harbor entrance.

341. Give true course and distance from Muskegon harbor entrance to Chicago harbor entrance.

342. Give true course and distance from Chicago breakwater light house to South Chicago harbor entrance.

343. Give true course and distance from Milwaukee harbor entrance to Michigan City harbor entrance.

344. Give true course and distance from Grand Haven harbor entrance to Manitowoc harbor entrance.

345. Give true course and distance from Chicago to Benton harbor entrance.

**QUESTIONS FOR MASTERS AND
MATES.—NO. 32.**

475. In correcting a true course for Var. and Dev., what kind of a course do you get?

476. Which way do you allow Ely. Var. and Dev. in converting a true course to a compass course?

477. What is a compass course?

478. What is a correct magnetic course?

479. In turning a true course into a compass course, which way do you allow Wly. Var. and Dev.?

480. If you did not allow for Ely. Var. or Dev., which way would it carry the ship from the course steered by compass?

481. Why is it that in finding the correction of the compass that it is necessary to separate the variation to get the correct deviation?

482. What is the difference between a true course and a compass course?

483. What is the difference between a true course and a correct magnetic course?

484. What is the difference between a correct magnetic course and a compass course?

485. How do you convert a compass course to a true course?

486. What is the difference between a true bearing and a compass bearing?

487. What is the difference between a

correct magnetic bearing and a compass bearing?

488. Which way do you allow Ely. Var. and Dev. in converting a compass course to a true course?

489. When you take the bearing of an object on shore and you wish to lay it off on the chart, what do you do with it first?

**INSPECTING PASSENGER
BOATS.**

The steamboat inspection service has been aroused into unusual activity owing to the frightful accident of the Larchmont in Long Island Sound recently. Supervising Inspector General George Uhler has issued a general order directing all supervising and local inspectors to begin at once a reinspection of the various steamers within their districts without previous notification to the owner of the vessel. In addition all excursion boats and ferry boats are to be inspected at least three times during the year by a different inspector upon each occasion. Should the equipment of the vessel be found not to be fully up to requirements, navigation must be stopped immediately. Following is the full text of Gen. Uhler's orders:

Supervising and local inspectors are hereby directed to begin at once a reinspection of the various steamers within their respective districts, with particular reference to steamers carrying large numbers of people, such as excursion boats and ferry boats. The reinspection will begin with excursion steamers whose certificates of inspection will expire after the opening of the excursion season, after which the order of inspection will be left to the judgment of the local inspectors. No notice of the contemplated reinspection of a vessel will be given the owner, master, or other interested person. Hereafter, in addition to the regular inspections, reinspections or examinations of excursion boats and ferry boats shall be made at least three times during the year or the season of service, and, in districts where assistant inspectors are employed, such reinspection shall not be made by an inspector or inspectors who made the inspection immediately preceding the reinspection. If it is found at any time that any vessel is in any way unfit for service, or can not be safely navigated, or that her equipment is not fully up to the requirements, the navigation of such vessel must stop immediately.

In conforming with the above ruling Thomas W. Gould, local assistant inspector at Cleveland, has been transferred to Detroit, and J. B. Hayward, assistant inspector of boilers at Cleveland, has been transferred to Milwaukee.

Capt. Thomas A. Scott, head of the Scott Wrecking Co., died recently at his home in New London, Conn., aged 77 years. Capt. Scott followed the sea from boyhood, having been master of sailing vessels, diver and wrecker. He also assisted in several engineering undertakings, having built, under the supervision of F. Hopkinson Smith as marine architect, the Race Rock lighthouse, a difficult engineering feat. He also superintended the work of laying the foundations of Brooklyn bridge.

**ASSISTANT ENGINEERS
APPOINTED.**

F. B. Smith, fleet engineer of the Pittsburg Steamship Co., has announced the appointments of the assistant engineers for the steamers of that big fleet. The assistants are appointed by the chief engineer, subject to the approval of the fleet engineer. The appointments follow:

STEAMERS.	FIRST ASSISTANT.
Bessemer	Urias Shoemaker
Black	Christ Howard
Eriton	Leland Haggan
Bunsen	John Everett
Cambria	John Mraz
Colgate	Elmer Zobl
Coralia	George Plumb
Corey	A. W. Smith
Cornell	Robert Townsend
Corona	Henry Oestreich
Corsica	A. S. Hawkins
Cort	C. P. Sampson
Crescent	R. I. McGuire
Eads	Carl Prahl
Edenborn	John Coleman
Edwood	W. T. Ramsay
Empire	W. O. Stebbins
Ericsson	Alfred Holland
Fairbairn	George H. Bowen
Frick	Joseph E. Coleman
Fulton	F. E. Gilbo
Gary	R. Needmeyer
Gates	George Emery
German	L. L. Vradenburg
Gilbert	J. W. Dewesia
Griffin	E. E. Hand
Harvard	Ed Oag
Hill	George Revenew
Houghton	James McKibbin
Ioliet	George L. Ferguson
La Salle	William McLaughlin
Linn	John Miller
McDougall	F. E. Lyons
Malietoa	Thomas Bouchard
Manola	Ed Donahue
Maricopa	Ray Huston
Marina	Richard Robinson
Mariposa	Joseph Krug
Mariska	Abe Auld
Maritana	Michael Gotter
Meruba	L. B. Broderick
Masaba	W. Wagner
Mataafa	Guy Webb
Mather	Herbert Culp
Matoa	H. W. Endelman
Maunaloa	H. F. Schroeder
Morgan	Neil Patterson
Morse	H. B. Moore
Murphy	J. W. Carter
Neilson	G. W. Andrews
Palmer	I. McMahon
Perkins	Harry Flood
Poe	A. C. Joyce
Pinecon	Ed Perantka
Queen	A. Liston
Rcam	Harry Edmondson
Rensselaer	A. Turner
Rockefeller	John Ackley
Rogers	H. Lubahn
Roman	William Culp
Saxon	Aaron Horton
Shaw	E. H. Pelton
Siemens	L. H. Smith
Stephenson	Joseph R. Marshall
Superior	H. C. Schroeder
Tavor	John Hall
Van Hise	J. R. McRae
Watt	W. P. Woodruff
Wawatam	Daniel Slattery
Widener	Frank Limpert
Weylin	Mac Campbell
Zenith City	E. D. Butler

STEAMER.	SECOND ASSISTANT.
Corey	Barney Platt
Edenborn	George Zanger
Edwood	P. McDonnell
Frick	Henry Grotmet
Gary	Leon Bourlier
Gates	E. H. Oehlenschlager
Hill	Elmer Adamson
Houghton	Myford Justin
McDougall	George Greenwood
Morgan	I. Williams
Norse	J. Shannon
Perkins	William Danforth
Poe	William F. Zeutgrebe
Rcam	Philip Rowe
Rogers	G. F. Schroeder
Widener	G. E. Heaska

NAVAL APPROPRIATIONS.

The annual Navy Year Book has just been issued and gives much information concerning the navy and appropriations for naval purposes since 1883, when Mr. Whitney, during Cleveland's administration, began the construction of our "new navy." The following table shows the amounts of the various naval appropriation acts for each year from act of March 3, 1883, to and including act of June 29, 1906:

AMOUNTS OF NAVAL APPROPRIATION ACTS
FOR EACH YEAR FROM ACT OF MARCH
3, 1883, TO AND INCLUDING ACT
OF JUNE 29, 1906.

1883	\$ 14,819,976.80
1884	15,894,434.23
1885	14,980,472.59
1886	15,070,837.95
1887	16,489,907.20
1888	25,767,348.19
1889	19,942,835.35
1890	21,692,510.27
1891	24,136,035.53
1892	31,541,654.78
1893	23,543,385.00
1894	22,104,061.38
1895	25,327,126.72
1896	29,416,245.31
1897	30,562,660.95
1898	33,003,234.10
1899	56,098,783.68
1900	48,099,969.58
1901	65,140,916.67
1902	78,101,791.00
1903	81,876,791.43
1904	97,505,140.94
1905	100,336,679.94
1906	102,091,670.27

Total \$993,544,469.95

The cost of all vessels since the inauguration of the "new naval policy, showing the cost completed of each battleship, armored cruiser, protected cruiser and unprotected cruiser is given in the accompanying table.

The greater cost of building vessels in navy yards as compared to their construction in private yards is well illustrated by the statistics of expenditures on vessels under construction prior to June 30, 1906.

The Connecticut, which was built at the Brooklyn navy yard, cost \$6,071,066.68, as compared with \$5,746,313.49, the cost of the Louisiana, a sister ship, built by the Newport News Ship Building & Dry Dock Co., Newport News, Va.

The total cost of all vessels of the new navy, built and building, is \$277,326,859.82.

The cost of maintenance of the various types of vessels, comprising cost of commission—including pay of officers, repairs—hull, machinery and equipage—is interesting. The first-class battleship Maine cost to maintain, \$624,935.48; second-class battleship Texas, \$341,282.90; armored cruiser West Virginia, \$544,399.92; protected cruiser Minneapolis, \$375,537.13;

COST OF ALL VESSELS OF THE NEW NAVY.

	Hull and machinery including armor and armament.	Equipage.	Total.
BATTLESHIPS.			
Texas	\$ 3,638,284 99	\$ 563,836 50	\$ 4,202,121 49
Indiana	5,333,708 05	649,663 93	5,983,371 98
Massachusetts	5,401,844 97	645,272 98	6,047,117 95
Oregon	5,914,021 90	661,010 86	6,575,032 76
Iowa	5,162,587 12	708,619 20	5,871,206 32
Kearsarge	4,429,890 69	613,700 99	5,043,591 68
Kentucky	4,418,094 99	580,024 44	4,998,119 43
Alabama	4,077,010 09	588,810 13	4,665,820 22
Wisconsin	4,162,517 53	561,276 75	4,723,894 28
Illinois	4,073,429 26	547,979 56	4,621,408 82
Maine	4,566,642 69	814,439 09	5,381,081 78
Missouri	4,438,925 08	819,335 47	5,258,260 55
Ohio	4,475,180 32	790,129 39	5,265,309 71
Total	\$60,092,237 68	\$8,544,099 29	\$68,636,336 97
ARMORED CRUISERS.			
Brooklyn	\$ 3,944,820 73	\$ 478,969 36	\$ 4,423,790 09
New York	3,897,840 32	448,802 07	4,346,642 39
Colorado	4,809,606 09	611,417 81	5,421,023 90
Pennsylvania	4,831,807 94	622,381 58	5,454,189 52
Maryland	4,866,839 34	600,476 25	5,467,315 59
West Virginia	4,876,580 16	615,918 50	5,492,498 66
Total	\$27,227,494 58	\$3,377,965 57	\$30,605,460 15
PROTECTED CRUISERS.			
Newark	\$ 1,439,382 20	\$ 390,735 00	\$ 1,830,117 20
Baltimore	1,554,483 94	422,245 41	1,976,729 35
Philadelphia	1,561,392 47	397,267 91	1,958,660 38
San Francisco	1,738,257 82	397,045 49	2,135,303 31
Olympia	2,484,027 54	495,255 84	2,979,283 38
Cincinnati	2,023,326 91	348,577 61	2,371,904 52
Raleigh	1,867,934 32	331,795 48	2,199,729 80
Columbia	3,461,960 26	447,051 00	3,909,011 26
Minneapolis	3,403,707 07	446,289 37	3,849,996 44
Tacoma	1,113,395 45	285,386 30	1,398,781 75
Cleveland	1,098,320 33	276,488 77	1,374,809 10
Denver	1,135,853 66	278,914 08	1,414,767 74
Des Moines	1,156,256 68	269,844 74	1,426,101 42
Chattanooga	1,377,941 56	308,148 45	1,686,090 01
Charleston	3,102,582 00	550,566 16	3,653,148 16
Galveston	1,426,366 06	263,285 68	1,689,651 74
Total	\$29,945,188 27	\$5,908,897 29	\$35,854,085 56
UNPROTECTED CRUISERS.			
Marblehead	\$ 1,061,426 30	\$ 229,736 63	\$ 1,291,162 93
Montgomery	1,050,933 54	216,176 17	1,267,109 71
Detroit	1,004,711 65	228,328 25	1,233,039 90
Total	\$ 3,117,071 49	\$ 674,241 05	\$ 3,791,312 54

monitor Florida, \$170,286.70; gunboat Princeton, \$110,332.43; torpedo boat destroyer Bainbridge, \$94,944.97; torpedo boat Dupont, \$36,172.40; submarine Porpoise, \$62,778.62.

HERMAN BIEDER.

Herman Bieder is a native of Switzerland, but for twenty-seven years he has held the fort at Ashtabula. He



HERMAN BIEDER.

has prospered in that time, but his first job only paid him \$5.50 for a year. He turned his hand at everything before he started the store that is now known as the H. Bieder Co. The store was burned out twice in

six months, but this and other disastrous business ventures did not daunt Mr. Bieder. The business was turned over to a stock company a year ago, Bieder retaining the largest interest.

Mr. Bieder has a model machine shop in the building he erected for his store. It is there that he worked out the principles of a patent key ring, cream whipper, soft drink mixer and horizontal ice cream freezer, which works by means of compressed air. He is now working on a machine which he expects will freeze the ice cream as it is being poured in. This he figures on putting on lake freighters. Mr. Bieder retired from active connection with the H. Bieder Co., Jan. 1, William Christianson becoming principal stockholder. Both men are known by all the captains, engineers, and sailors on the lakes. This summer, Mr. Bieder will visit his mother in Switzerland.

The new subsidized steamship service between British Columbian and Mexican ports is to be maintained by the steamers Georgia and Lonsdale, owned by Harris & Dixon, London. The steamers are capable of steaming 12 to 13 knots, but the subsidy requirement is only 10 knots.